VOLUME 25

PUBLISHED JULY 1986

SECRET CB®

TEXAS SESQUICENTENNIAL

CONFIDENTIAL

FACTUAL REPORT

SCHEMATICS ETC.

PRICE $20.00 U.S. FUNDS

IMPORTANT: READ THIS FIRST

The information in this book is not to be used to exceed F.C.C. specifications, in any case, as applied to power, modulation, frequency spectrum, etc. It is illegal to do this to any CLASS D RADIO.

This book is a factual report of gathered information, and as such is intended for use on radios for EXPORT ONLY.

If you are not familiar with electronics, it is better to check for advice with your local electronics or CB center, as to restrictions, etc., concerning your radio.

More information, on other units will be forthcoming in future issues.

This book will not be found at a book store, but can be obtained through your local CB Dealer or Distributor, or direct from Selman Enterprises.

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ACKNOWLEDGEMENTS

SECRET CB WISHES TO GRATEFULLY ACKNOWLEDGE THE FOLLOWING PEOPLE FOR THEIR HELP AND CONTRIBUTIONS TOWARD GETTING VOLUME 25 IN PRINT. THEIR ENCOURAGEMENT AND CONTRIBUTION OF MATERIAL HAS BEEN INVALUABLE.

DAVID ANDERSON
LESCOM
JOHN LEVINS
GREG LOWRY
R. M.
JIM SCHLEITWILER
TERRY SHELLEY
JIM SIMPSON
ROGER STRUBHAR
KEN TOUHEY
BILL WENTZ

WANTED

NEW MODIFICATIONS
NEW CONVERSIONS
TECHNICAL TIPS
PROJECT PLANS
ETC. ETC. ETC.

DORIS SAYS "THANKS" AND A FREE BOOK TO THE ABOVE PEOPLE.

INTRODUCTION

This is the year of CELEBRATIONS! The Statue of Liberty's Centennial Celebration, Texas Sesquicentennial Celebration, Selman Enterprises 10th Anniversary Celebration, SECRET CB's 9th Anniversary and 25th Volume Celebration, and FREEDOM.

For those who are not aware - there is a conversion for the TC9109 Chip. Good replacements for the 2SC1307 are 2SC2312 and MRF475.

Card-Kit Electronics has come up with an exciting new kit for the New Cobra Plus units, the Cobra LTD units, and Sister units. By 'Sister units' we mean a radio with uniden board which uses a separate VCO circuit and FET's for mixing. It is called the LTD KIT. Selman Enterprises Catalog #136LTD. Complete information and installation instructions in this volume.

We did not put an index in this volume. Please refer to Volume 24 for the latest index. An updated index will be in Volume 26.

We can be proud we are FREE. Free to express ourselves, free to write, free to read, free to experiment, and much, much more.

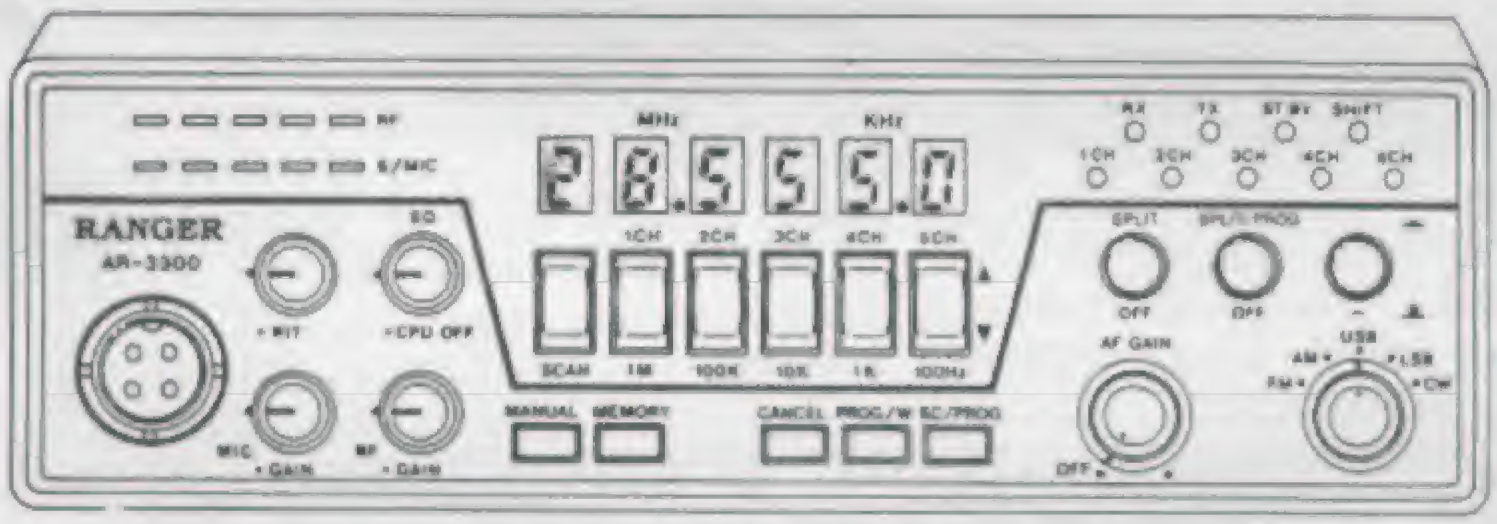
GOD BLESS AMERICA!

TABLE OF CONTENTS

FINALLY! A company that is willing to work with SCB in providing information. The new RANGER AR3300 (Specs. below): very good unit; comes with schematic of main PCB. Microprocessor schematic/front panel is not given out for a very good reason (send back to factory as unit comes with a 1 Yr. Warranty). This is a definite "work-with-you-outfit", not one of these "gotcha Sucker" companys.

As most of you know Dynascan Corporation has a new line of "Plus" series on the market. Seven (7) "Ancient Mary" mobiles with up/down push buttons for channel selection? SCB has the dealer promo sheets but no other information has been received. (If you get them, we need.....)

CLEAR CHANNEL CORPORATION



PRELIMINARY DATA SHEET

The AR-3300 is an HF all-mode transceiver incorporating the latest microprocessor technology. The transceiver operates continuously from 28.0000-29.9999 MHz. The transceiver operates on 13.6VDC either mobile or base operation with proper power supply.

Frequency selection is entered through either the momentary switches located below the frequency display or by automatic scanning. The scanner will stop whenever a signal appears that is strong enough to open the squelch. Frequency resolution is selectable in 100Hz, 1000Hz, 10,000Hz, or 100,000Hz steps.

Up to five preset frequencies may be stored in the computer's memory.

The AR-3300 can be programmed to split transceive. Transmit on one frequency and receive on another. This is accomplished by programming the shift controls. Any two frequencies within its operating frequency range may be used. The frequency display will automatically show both frequencies.

General

Frequency Range:	28.0000-29.9999*
Modes:	AM, FM, LSB, USB, and CW
Speaker:	8 Ω
Microphone:	Dynamic 600 Ω (OHM)
Power:	13.8V D.C.
Antenna IMP:	50 Ω
Size:	H60 x W197 x D279mm 2-3/8 x 7-3/4 x 11

Receiver

Dual Conversion Superhetrodyne

Sensitivity:	AM 1uV @10dB S/N FM 1uV @10dB S/N SSB 0.3uV @10dB S/N
Selectivity:	AM/FM 6KHz 6dB Down @ ± 3KHz ± 9KHz – 60dB Down SSB 2.2KHz @6dB Down
AGC:	AF 10dB Down RF – 80
Audio Output:	2 Watts 10%
IF Frequency:	1st 10.695MHz 2nd 455KHz

Transmitter

SSB Output:	25 Watts PEP
SSB Carrier Suppression:	– 40dB
Unwanted SSB Suppression:	– 50dB
Harmonic Suppression	– 50dB
AM/FM Output:	8 Watts
Deviation:	± 1.5KHz
Modulation Capability:	85%
Harmonic Suppression	– 50dB
IMD:	– 30dB
ALC (Auto Level Control)	20dB

CLEAR CHANNEL CORPORATION

RANGER

AR-3300

HF Mobile All-Mode Amateur Transceiver

AR-3300 ALIGNMENT PROCEDURE

SYNTHESIZER

VCO

1. Set the radio to 29.9000MHz FM mode
2. Connect DVM to TP-1 and adjust T13 for 3.8 VDC.
3. Set the radio to 28.0000MHz. (Clarifier at mid-point)
4. Connect oscilloscope to TP-2.
   a. Adjust VR3 for 17.305MHz in FM mode.
   b. Adjust VR1 for 17.3075MHz in USB mode.
   c. Adjust VR2 for 17.3025MHz in LSB mode.
5. Adjust T14 for output frequency of 28.0000MHz.
6. Connect frequency counter to TP-3 (high impedance probe).
   a. Adjust T16 for 10.6925MHz in USB receive mode.
   b. Adjust T17 for 10.6975MHz in LSB receive mode.
   c. Adjust T15 for 10.6943MHz in CW receive mode.

RECEIVER

IF (10.695MHz)

1. Set radio to AM mode. Apply a 10.695MHz (AM modulated at 60%) signal from signal generator through a loop antenna to the area of Q2. (Output of signal generator should be about 12db Sinad)
2. Adjust T4, T5, T8, T9, and T10 for maximum AF output. (NOTE: any excessive signal generator output will activate AGC and cause a false alignment.)
3. Set the radio to CW mode, Signal generator to 0% modulation. Adjust T6 and T7 for maximum audio output.

NOISE BLANKER

1. Set radio as in IF alignment. Adjust T400 and T401 for maximum audio output.

FM QUADRATURE

1. Set the radio to FM mode. Apply a 10.695MHz (FM deviation at 1KHz) signal from signal generator through a loop antenna to the area of Q2. (Output of signal generator should be about 12db Sinad).
2. Adjust T18 for minimum Sinad.

CLEAR CHANNEL CORPORATION

AR-3300

HF Mobile All-Mode Amateur Transceiver

ALIGNMENT PROCEDURE

RECEIVER

FM MODE
1. Set radio to 28.0000MHz FM mode.
2. Adjust T19, T20, T21 and T22 for maximum RF output power.
3. Balance RF output between lowest and highest frequency with L6, L7 and L9.
4. Apply 1,000Hz tone to microphone and adjust VR4 for a maximum deviation of 1.5KHz.

SSB MODE
1. Set the radio to 28.0000MHz USB mode.
2. Set "MIKE GAIN" to minimum and adjust VR9 for minimum RF output.
3. Set "MIKE GAIN" to maximum and apply 1,000Hz tone to microphone. Adjust VR15 for maximum RF power output then back off until power drops slightly (about 2 watts).

AM MODE
1. Set radio to 28.0000MHz AM mode.
2. Adjust VR16 for 7 watts output power.
3. Apply 1,000Hz tone to microphone. Adjust VR17 for 95% modulation.

RF OUTPUT METER
1. Set radio to 28.0000MHz FM mode.
2. Adjust VR11 so that two LED bars are lit with 7 watts output power.

TRANSMITTER

HIGH FREQUENCY

1. Set the radio to 28.0000MHz on AM mode.
2. Apply a 28.0000MHz (AM modulated at 60%) signal to antenna terminal.
3. Adjust T1, T2, and T3 for maximum AF output. (Output of signal generator should be about 12db Sinad).

IF NOISE

1. Set the radio to LSB mode and disconnect any input to antenna terminal.
2. Adjust R39 for an AF output of 0.2 VRMS with "AF GAIN" at maximum.

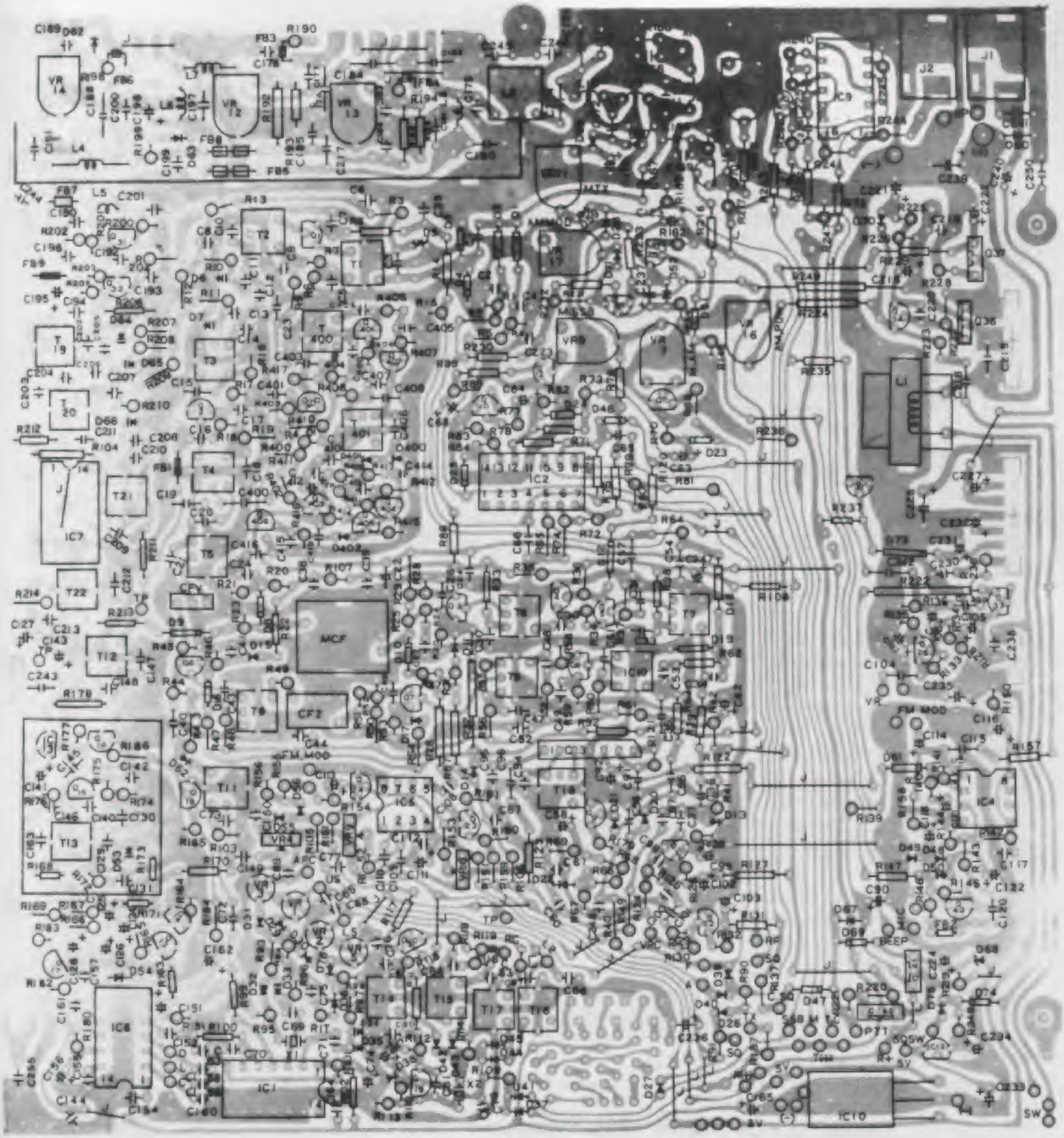
S METER

1. Set the radio to 28.0000MHz on FM mode.
2. Apply a 28.0000MHz signal to antenna terminal at 50db.
3. Adjust VR7 so that four LED bars are lit.
4. Set the radio to USB mode.
5. Adjust VR8 so that four LED bars are lit.

CLEAR CHANNEL
CORPORATION

AR-3300

PCB LAYOUT



CLEAR CHANNEL CORPORATION

AR-3300 TECHNICAL BULLETIN #1
APR 4, 1986

SYMPTOM: First word clipped off.

CAUSE: Modulation amplifier slow turning on (.25 to .5 sec.)

REMEDY: Change R139 to 4.7 Kohm. Move the cathode of D61 to the base of Q43. Add 220 mfd @ 16V + side to anode D61, - side to ground. (Diode and cap should be placed on bottom (solder side) of PCB for best results.

NOTES: This will completely eliminate this problem. All radios received for service should be modified with this change. This change incorporated at the factory beginning with serial#86020801

SEE PAGE 9 FOR PARTS LOCATIONS.

AR-3300 TECHNICAL BULLETIN #3
APR. 23, 1986

SYMPTOMS: Warble (frequency shift) on SSB. Squeal (audio oscillation) on AM.

CAUSE: Ground loop and by-pass problems on PCB.

REMEDY: Connect open in ground plane on PCB near audio IC8 (see page 2, location A). Connect a .01 capacitor from the spot where ground plane is connected to chassis.

Tighten screws that hold PCB to chassis.

Add by-pass capacitor (.01) at location B (see page 2, location B).

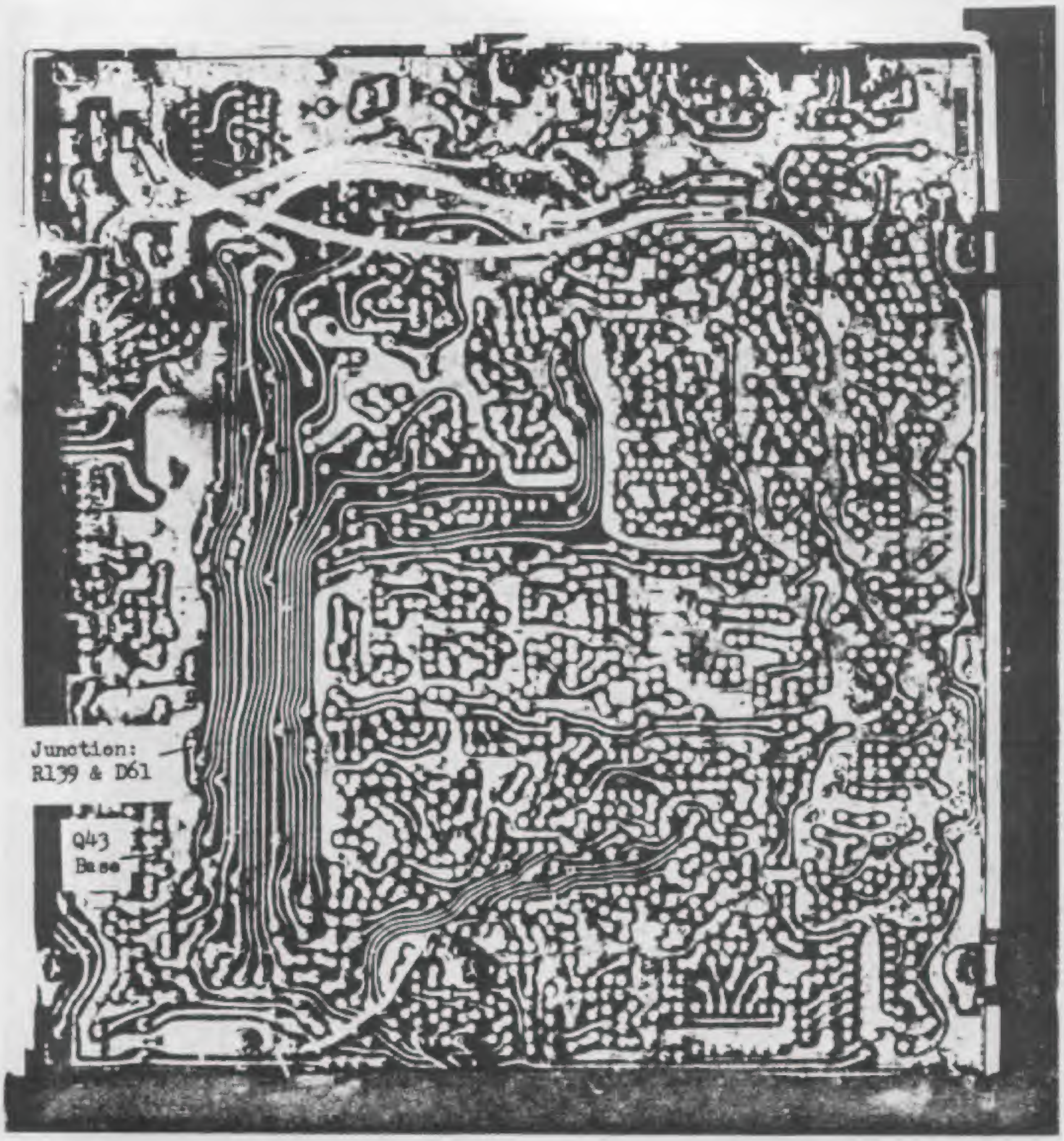
Scrape the inside of covers by mounting screws to improve connection to chassis when covers are on.

Install by-pass capacitors (.01) between mounting screws of Q28, Q29, Q30 and the RF shield around the power amplifier area. Install a by-pass capacitor from the RF shield and the ground lug of the SO-239 antenna connector.

NOTES: This will completely eliminate this problem. All radios received for service should be modified with this change.

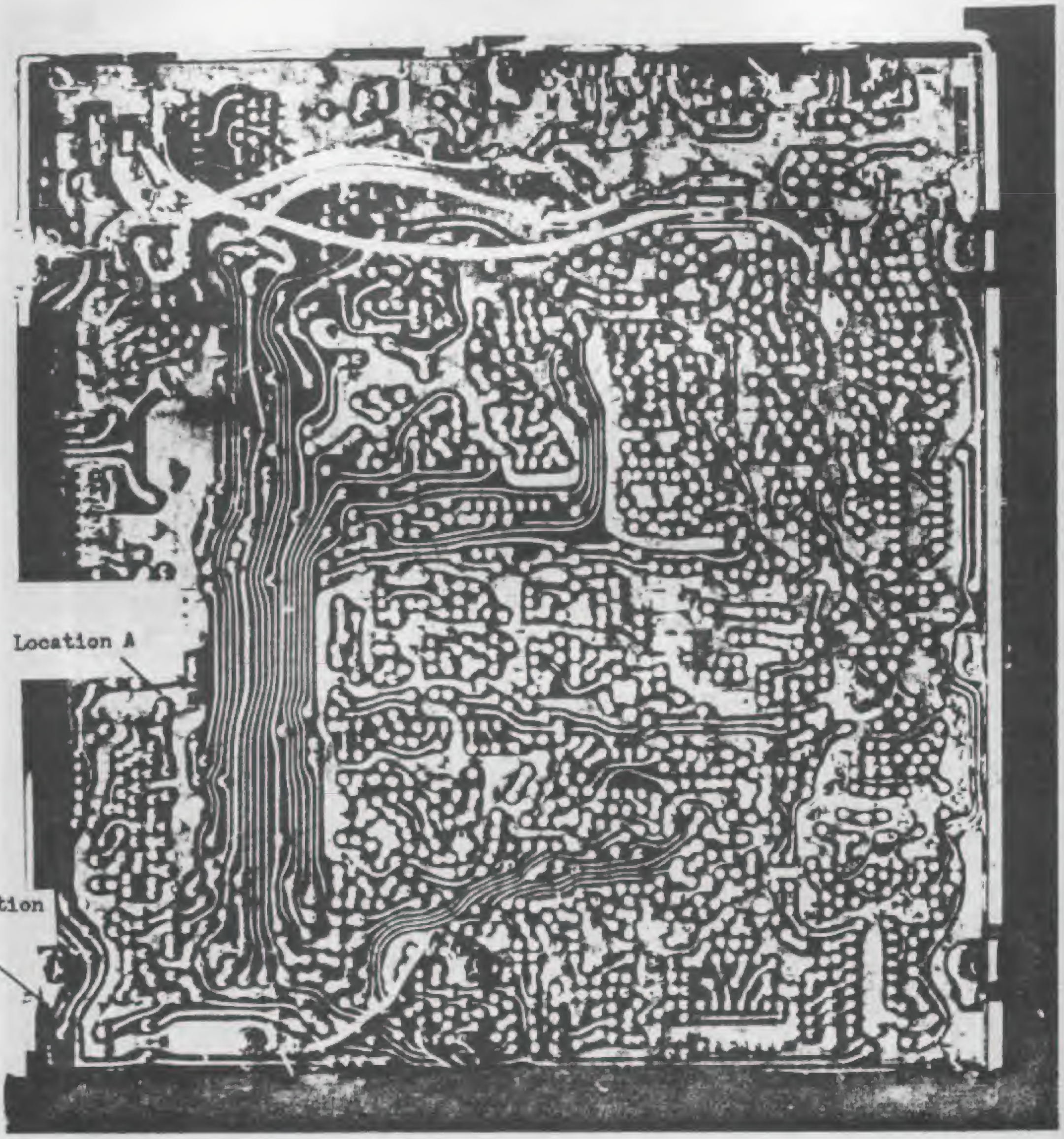
PAGE 10 FOR PARTS LOCATIONS.

CLEAR CHANNEL CORPORATION



CLEAR CHANNEL
CORPORATION

TECHNICAL BULLETIN #3



AR-3300 TECHNICAL BULLETIN #2

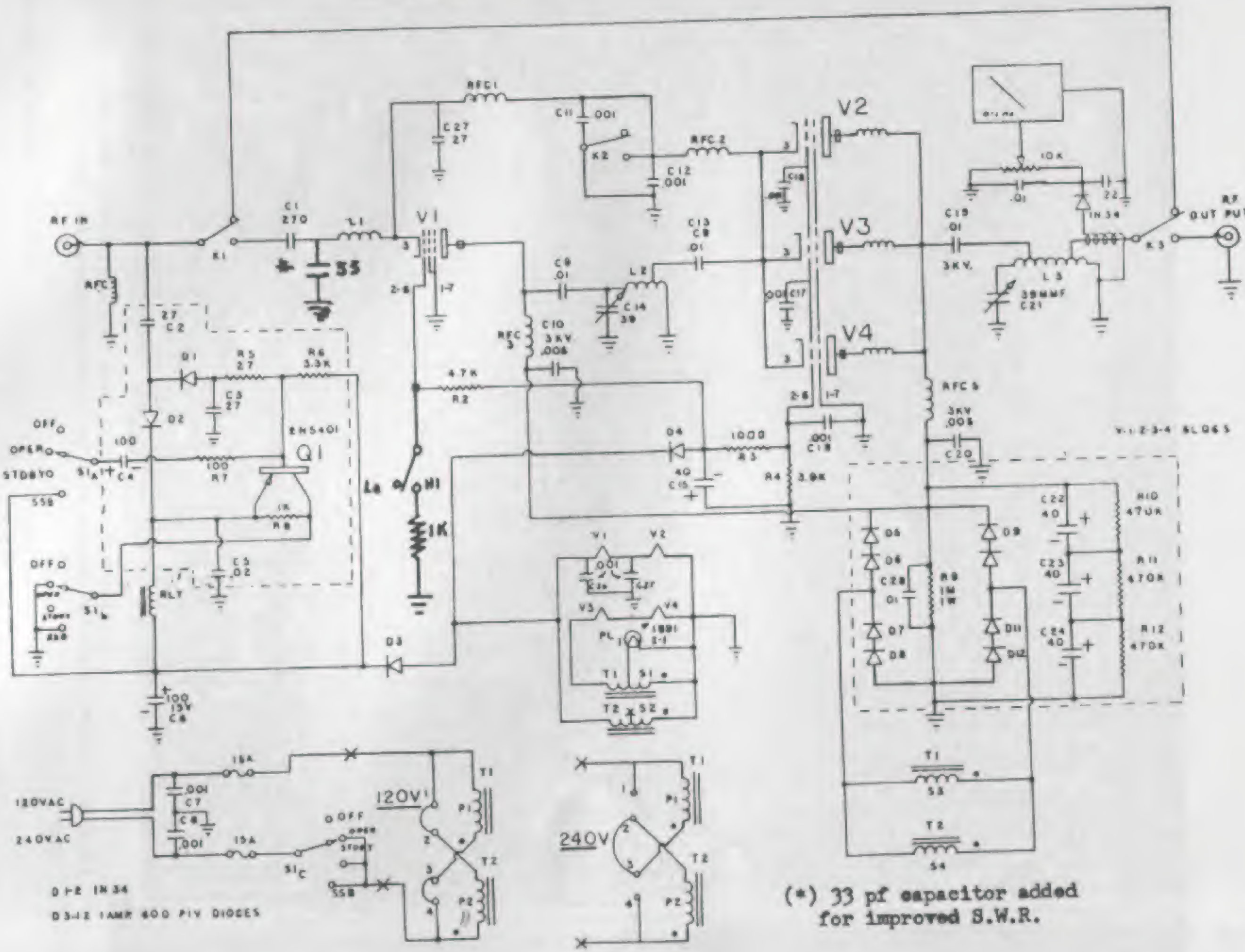
CLEAR CHANNEL CORPORATION

NOISE BLANKER SWITCH

To turn off the noise-blanker cut the trace marked below. A SPST switch can be installed at the cut for a control.

KICKER 500

Linear Amp. Schematic



(*) 33 pf capacitor added for improved S.W.R.

THE C TEAM

UPDATE: WIDEBANDING MODIFICATION UHIC-005 VCO CHIP

by J.S.

"This modification does work; (Reference SCB #24, Pg. 26); but it is definitely a hit or miss proposition" ...Editor - 'I know as messed up two VCO chips myself $$$$'. I sent the chips to a person who works in this area and one of these was successfully modified.

Below is how it was done. NOTE: The CT-1 diode is available from Selman Enterprises in very limited quantities.

THIS MODIFICATION REQUIRES THE RIGHT TOOLS AND MUCHO PATIENCE!!!

The UHIC-005 is a thick film I.C. Gold circuit paths are silkscreened on a ceramic substrate. These paths are less than .001" thick. Micro-miniature components are bonded onto the substrate with conductive epoxy. These components can be removed and changed; IF YOU KNOW WHAT YOU'RE DOING. Otherwise, you'll end up with some very expensive junk.

If you want to try this modification yourself, get the following tools and parts together:

1. A fixture to hold the UHIC-005 securely.
2. A good quality microscope, or a high power jeweler's eyepiece.
3. A set of jeweler's files or a Dremel tool with a 1/32" ball and mill.
4. High silver content 2-part conductive epoxy, (Ablestick 88-1, or equivalent).
5. UHIC-005 VCO and CT-1 diode.

* * * * * * * * * * * * * * * * * * *

PROCEDURE

Before starting, remember that if you want to do this modification sucessfully, you MUST EXERCISE EXTREME PATIENCE. After you've done 2 or 3 units, it will be easier, but start slow..... A word to the wise.....

1. Place VCO chip in fixture (number side down) and locate varactor diode. See SCB Vol. 24, pg. 26 for all drawings as to location.

VERY VERY CAREFULLY, use the jeweler's files to file/scrape/remove the epoxy coating from around the diode. Be extremely careful not to cut into the ceramic substrate as it is very easy to sever a circuit path and render the device unuseable.

Examine the diode, and CAREFULLY remove as much of the conductive epoxy from around the ends of the diode as possible.

Now come the hard part! The diode must be removed by fracturing the epoxy bond between the substrate and the diode. I usually use a small set of pliers and break it off with a slight rocking motion. It can also be pried up with an Xacto or scribe. Use whatever method feels most comfortable to you. The diode is expendable, and the bottom line is to get it out of there without causing any other damage. GOOD LUCK!

Once the diode is removed, use the files or an Xacto to scrape the gold mounting pads clean.

UPDATE: UHIC-005 ....(Cont.)....

2. Bend and cut the leads on the replacement diode to fit the mounting pads. Use a tooth pick to apply a small drop of epoxy to each pad and put the diode in place (observe polarity). Use the toothpick to make certain that the epoxy makes good contact with the diode leads.

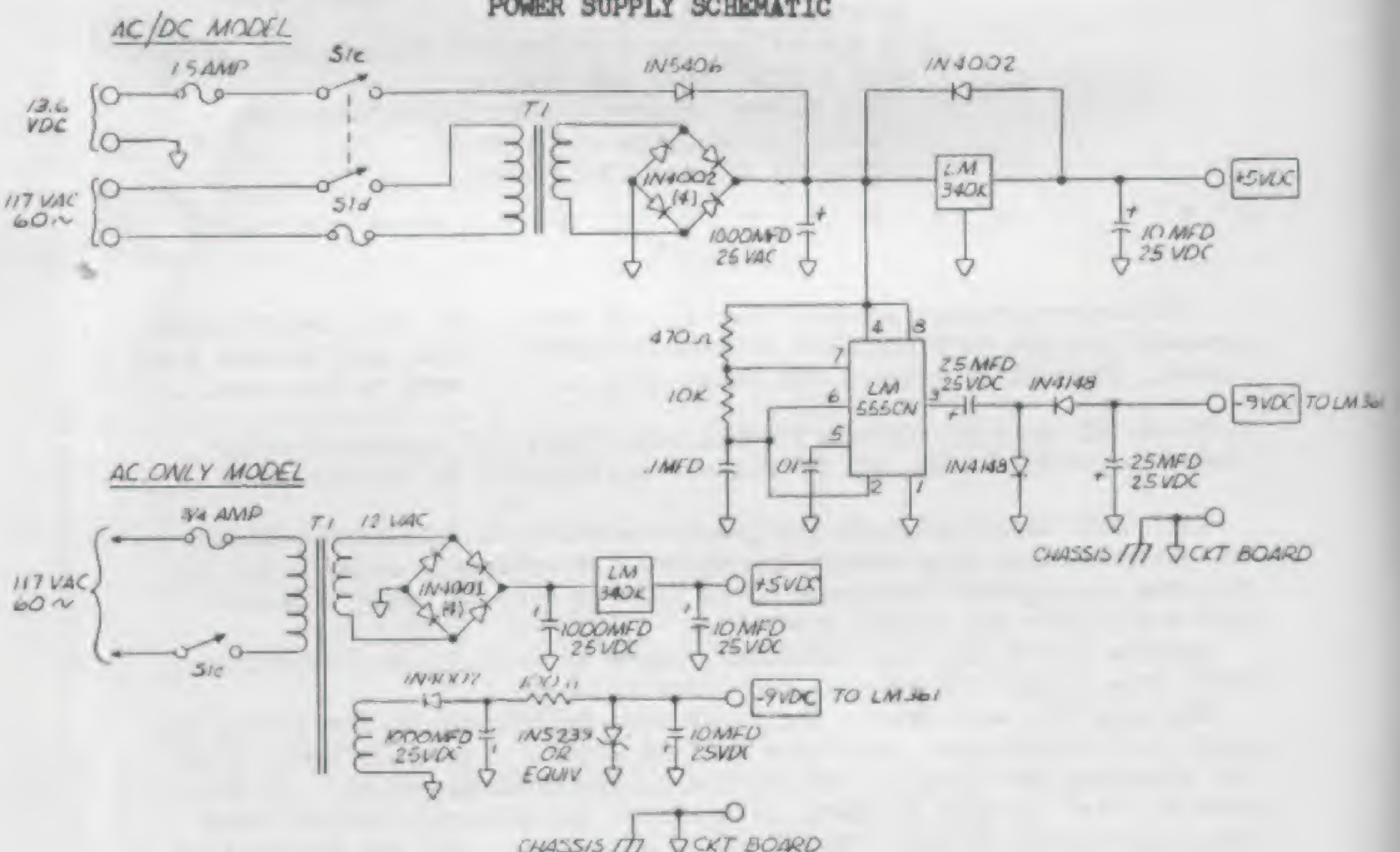
Place the chip and fixture in a preheated oven (150 degrees F.) for about an hour. Let cool and test.

If unit tests good, cover new diode with a two-part hard epoxy or RTV as a moisture barrier.

Reinstall modified UHIC-005 in PC Board, and enjoy.....

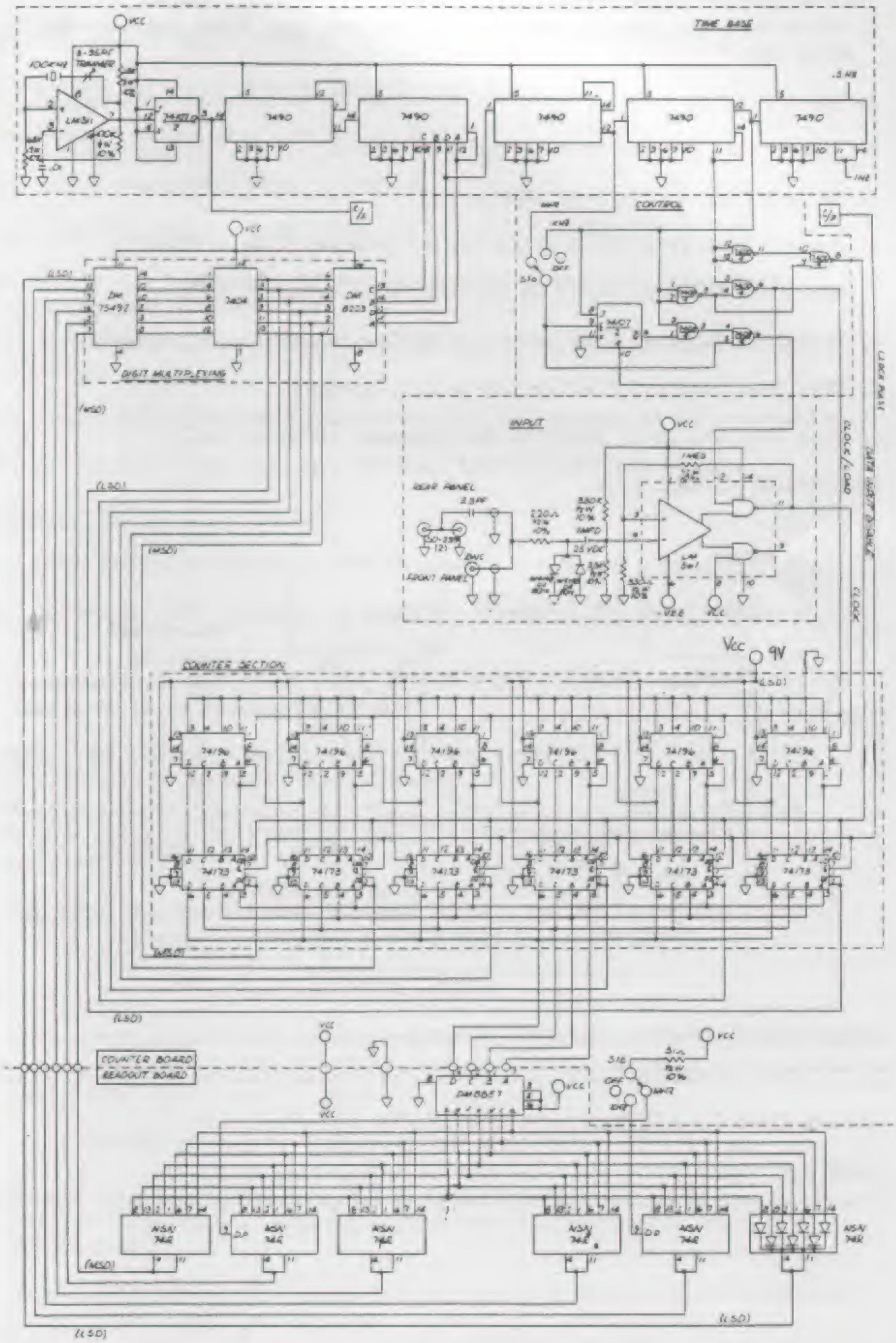
PALOMAR PC-40

POWER SUPPLY SCHEMATIC



PALOMAR FC-40

MAIN PCB SCHEMATIC



Cobra 40X; "Card Kit-A" Installation

by T.S.

1. Unsolder Blue wire from Pin 20 of IC202.

2. Re-solder Blue wire to terminal P on switch, and Blank terminal on epoxy pak.

3. Add a 4.7 ohm resistor from Pin 20 of IC202 to terminal Q on switch.

4. Remove C320 from contacting Pin 4 of IC203.

5. Replace C320 to Pin 5 of IC203.

6. Install 47pf from Pin 4 of IC203, to terminal K on switch.

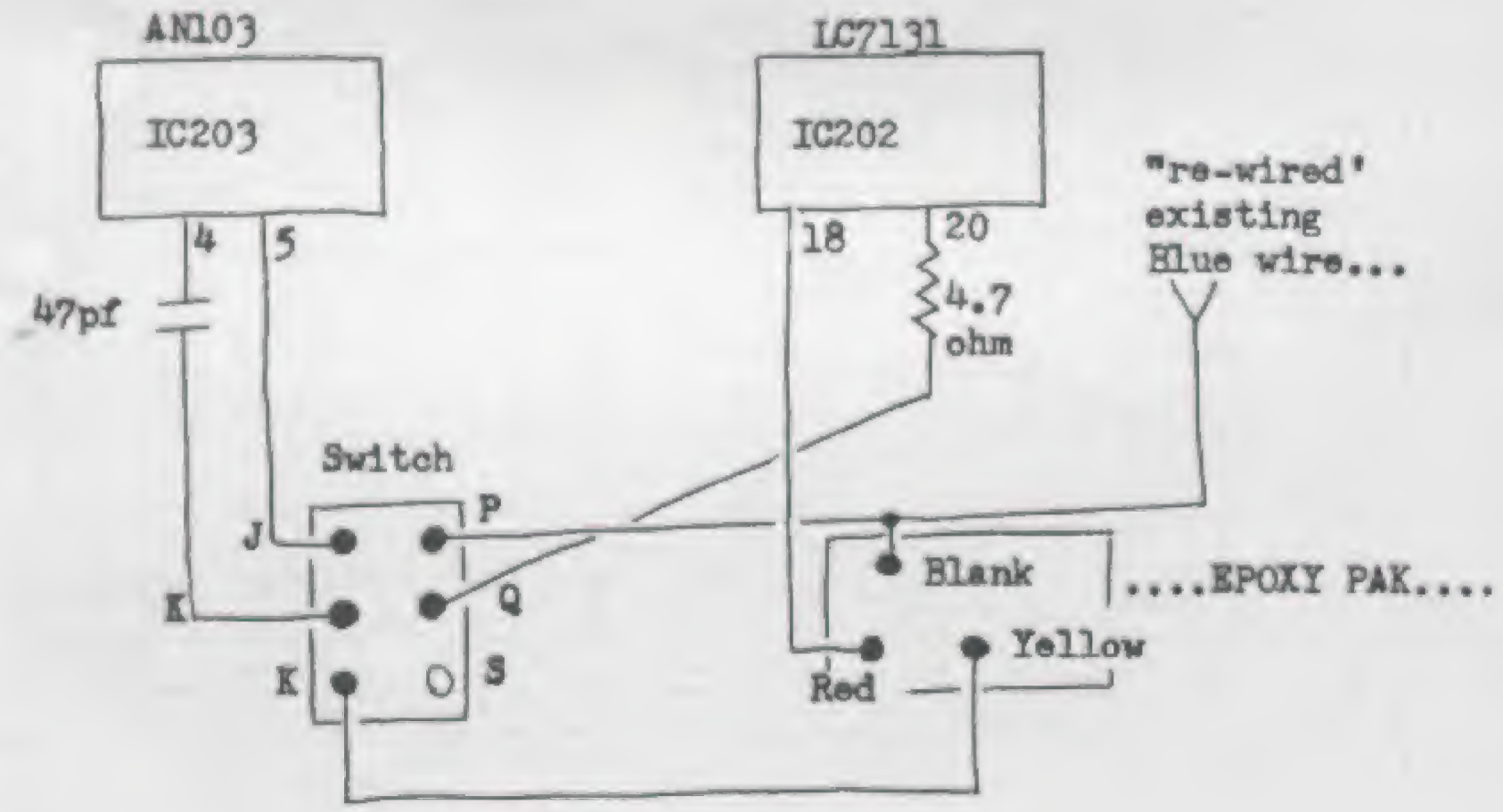
7. Wire from Pin 5 of IC203 to terminal J on switch.

8. Wire from terminal L of switch to Yellow terminal on epoxy pak.

9. Wire from terminal S of switch to D.C. ground.

10. Wire from pin 18 of IC202 to Red terminal on epoxy pak.

SEE DRAWING BELOW.....



Retune TX/RX circuitry for full coverage.....

****

CORRECTION ON KENWOOD 430 IN VOLUME 18, PAGE 25:
DO NOT REMOVE J-10, JUST CLIP WIRES 1 and 2, LEAVE #3 WIRE AS IS.

****

UNIDEN PC-122 - Kit #146 Installation

Use the parts layout on page 20 of Vol. 24 as a guide if needed.

1. Isolate Pin 10 by cutting foil trace on bottom side of PCB.

2. Solder the Brown wire to Ground - Pin 21.

3. Solder the Red wire to 5VDC. - Pin 11.

4. Solder the Orange wire to Pin 14.

5. Solder the Yellow wire to Pin 10.

6. Solder the Green wire to the other side of the foil trace that was isolated from Pin 10.

7. Remove C67 (2PF) and save, install the 1PF capacitor that comes in kit.

8. Remove C66 (5PF) and replace with the 2PF removed at C67 originally.

9. Change R106 (100 ohm) to a 47 ohm, this is provided in kit.

Alignment:

1. With switch in center position, check for regular 1-40 operation.

2. Switch in DOWN position, adjust the tripler (L38) for 27.285 on ch. 1.

3. Switch in UP position, check for 27.605-28.045MHz. The VCO (L13) may have to be adjusted slightly.

NOTE: The tuning on tripler L38 is very critical, but with a little patience can be adjusted for full range.

"Small/Compact! Great for the tight installation. 18W on SSB, with 7W AM - swing to 12W. So far unit has performed flawlessly!"
R.S.

Ed. Note: For further modification of unit (slide) and complete line-up proceedure; see SCB Vol. 24, pages 19-22.

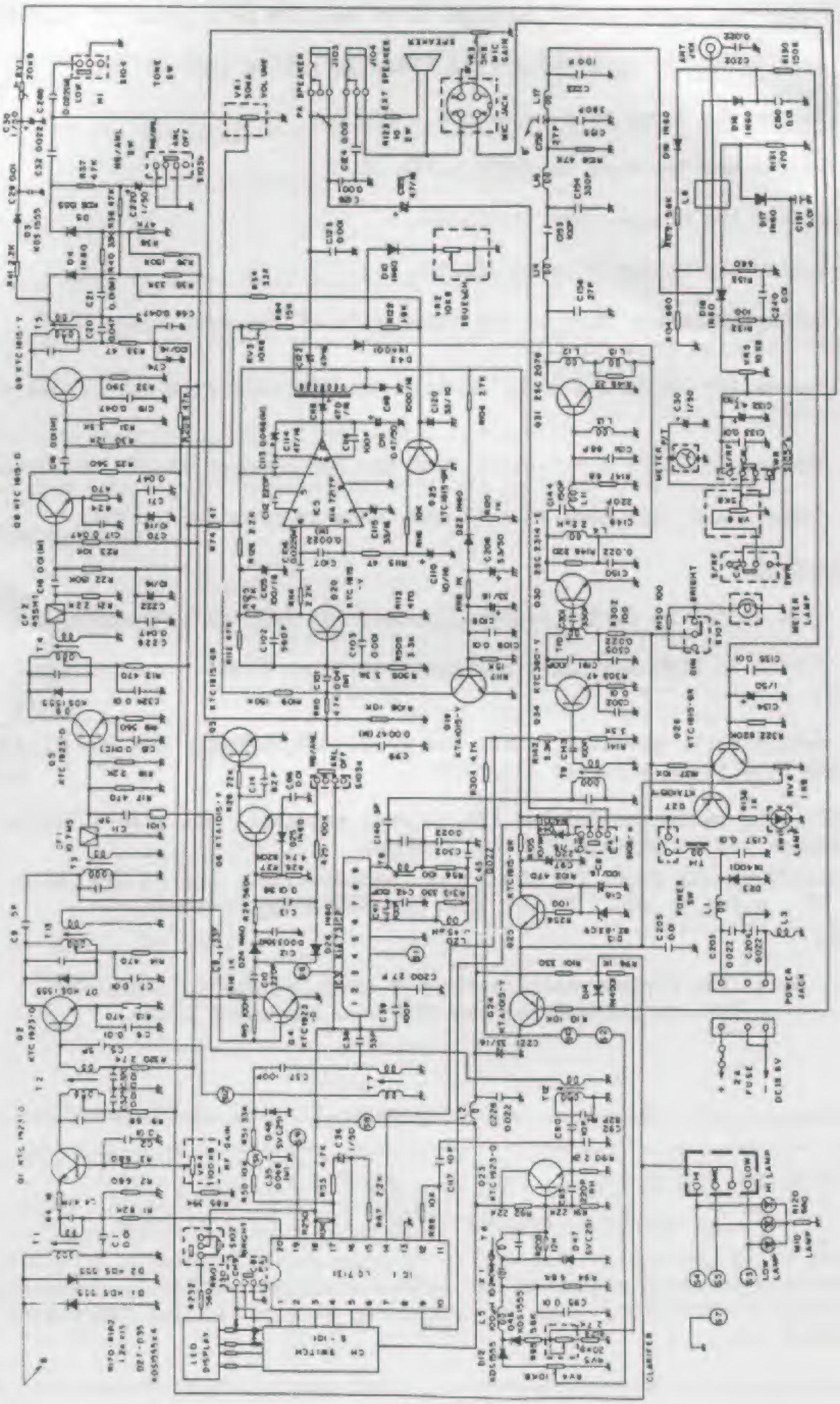
****

CORRECTION FOR VOLUME 16, PAGE 33 - M58472P PLL CHIP:

This was a correction that had to be made when modifying a GE 3-5801A. Source also found that Sams had made a mistake in CB144 by reversing Emitter & Collector. When he hooked red wire to Emitter everything worked good.

****

TRISTAR 240



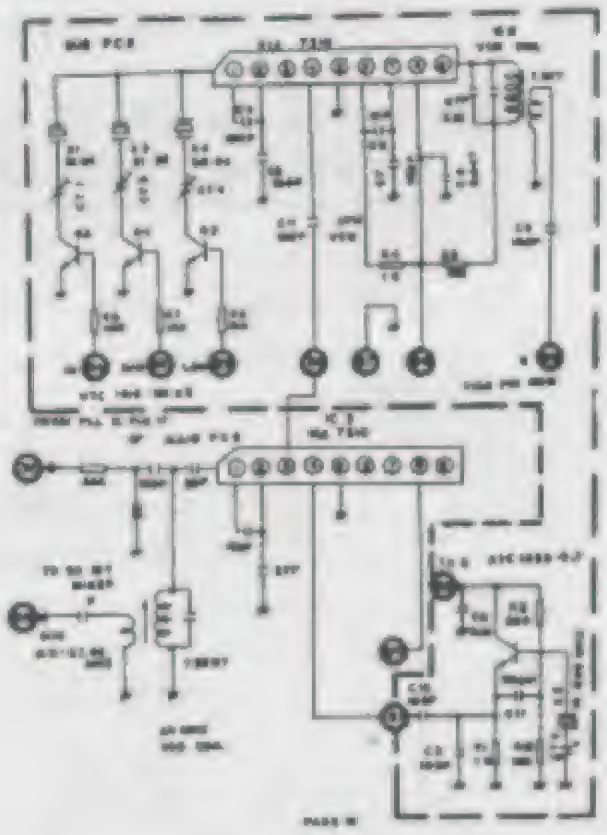
Tristar 240: 120 Ch. AM (LC7131-PLL)

This is another EXPORT unit.. A DELUXE version, with frequency range of 26.515-27.855MHz. Study the 'Delta Tune' circuitry very carefully and will see that it can be modified to tune both TX/RX as in SSB 'slide'. Tuneup: RV1-Rx Mtr, RV3-Sq Rng, RV4-TX Frequency Adj, RV5-Tx Mtr, RV6-AWI. RX-T1, T2, T13, T3, T4, and T5. TX-T8, T9, and T10. Increase C220 for less noise. R106 is the AMC disable if needed. This unit has a 10W/3A RF Final. CF2 may be doubled up for better rejection.

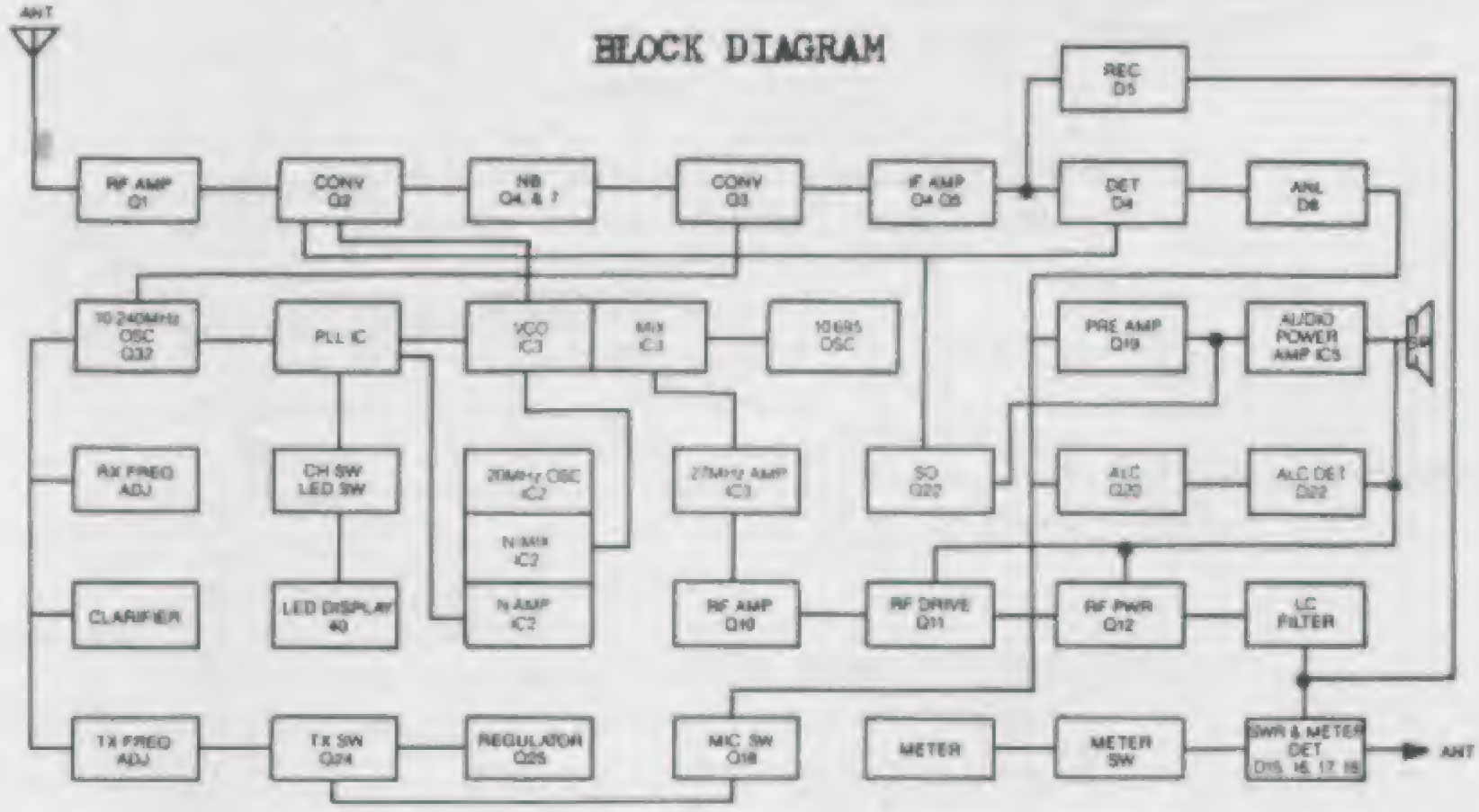
The present crystals: 21.84MHz = 27.415-27.855
21.39MHz = 26.965-27.405
20.94MHz = 26.515-26.955

Overall.....is an excellent unit for someone that is looking for an "Ancient Mary" rig.

CRYSTAL BOARD SCHEMATIC



BLOCK DIAGRAM



Kraco KCB4007: "Card Kit-A" Installation

by T.S.

1. Remove Orange wire from Pin 20 of LC7131, connect to terminal Q of switch.

2. Add 4.7 ohm resistor from Pin 20 to terminal P of switch. Add another wire from P to Blank terminal on epoxy pak.

3. Remove capacitor off Pin 4 of TA7310P I.C..

4. Add 47pf capacitor from Pin 4 to terminal K on switch.

5. Wire from where capacitor was soldered opposite Pin 4 TA7310P to terminal J..

6. Wire from terminal L to Yellow on epoxy pak.

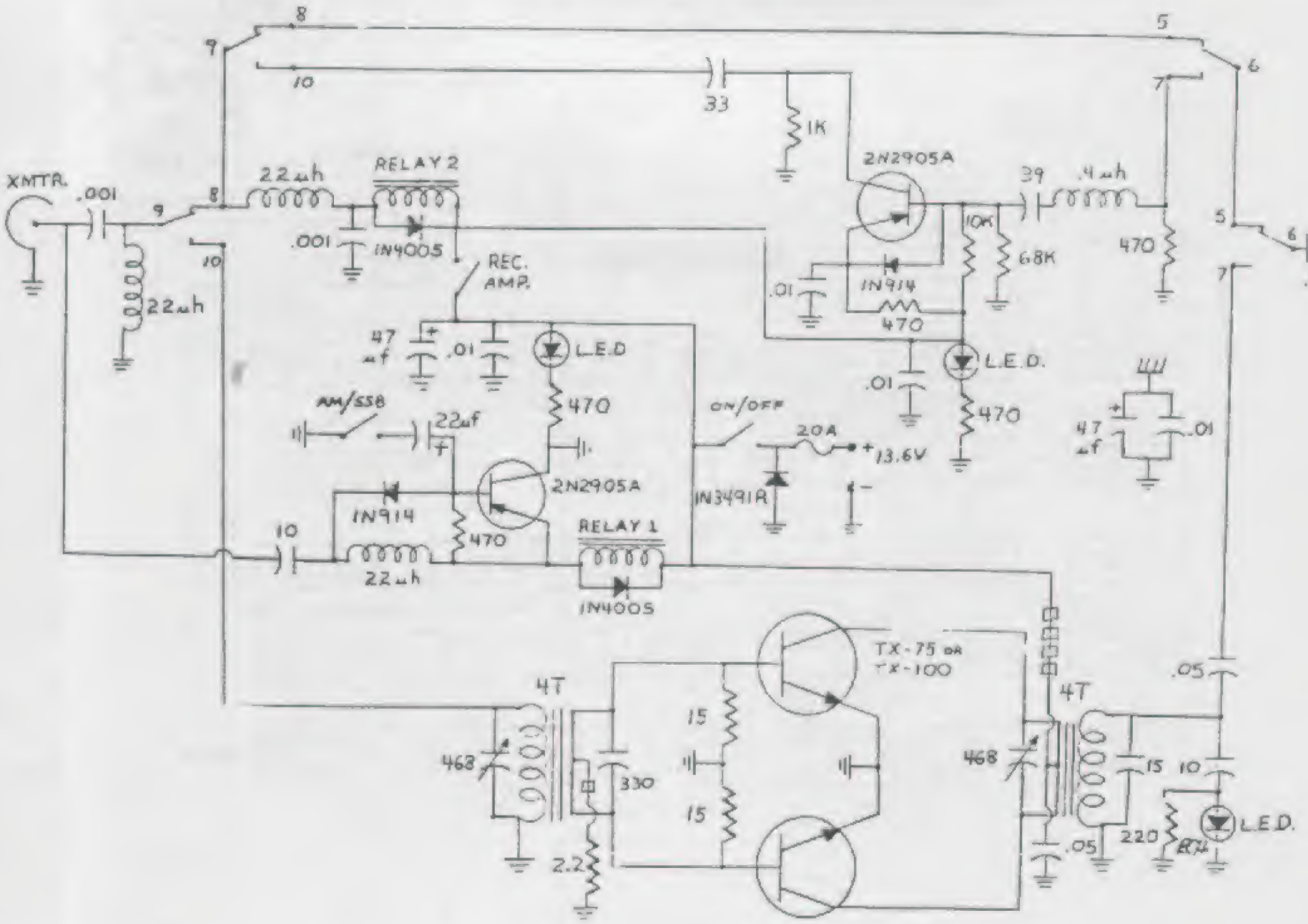
7. Wire from Pin 18 LC7131 to Red on epoxy pak.

Retune TX/RX circuitry...

(NOTE: coils in RF TX section may be replaced with tuneable coils for additional gain in output power.)

PALOMAR TX-75. TX-100

LINEAR AMPLIFIER SCHEMATIC



SCANNER TRICKS

"Reprinted by permission of LESCOM"

REGENCY ACT-16K: Frequency Limits Removal

1. Touch "MA"
2. Touch "9"
3. Touch "CL"
4. This removes frequency limits.

Frequency Limits Re-entered

1. Touch "MA"
2. Touch "9"
3. Touch "."
4. Frequency limit back in.

BEARCAT 220: OUT OF BAND SEARCH - All 3 bands.....

50-118MHz Range
1. Manually select Channel 2. Enter "50.000"
2. Select channel 1 in manual mode.
3. Enter "50.000" and press "Limit".
4. Step to channel 2, and enter "118.000" and press "Limit".
5. Press "Search". The unit will display "Error".
6. Press "Limit" again.
7. Press "Search".

Unit will now be searching from 50-118MHz.
Press "Scan" to resume normal functions.

136-144MHz Range
1. Manually select Channel 2. Enter "136.000".
2. Select Channel 1 in manual mode.
3. Enter "136.000" and press "Limit".
4. Step to Channel 2 and enter "144.000" and press "Limit".
5. Press "Search". The unit will display "Error".
6. Press "Limit" again.
7. Press "Search".

Unit will now be searching from 136-144MHz.
Press "Scan" to resume normal functions.

174-420.5MHz Range
1. Manually select Channel 2. Enter "174.000".
2. Select Channel 1 in manual mode.
3. Enter "174.000" and press "Limit".
4. Step to Channel 2 and enter "420.500" and press "Limit".
5. Press "Search". The unit will display "Error".
6. Press "Limit" again.
7. Press "Search".

Unit will now be searching from 174-420.5MHz.
Press "Scan" to resume normal functions.

SCANNER TRICKS.....(Cont.).....

BEARCAT 220: STORING 'ACTIVE' OUT OF BAND FREQUENCIES.....

Although you can store and monitor these out of band frequencies, we have been unable to get the unit to include them in it's listening while scanning.
Once you've entered the search limits, you can go to "Scan" and then back to "Manual" and step to any channel without wiping out your search data. So before you start any serious searching, go to "Scan", then back to "Manual". Manually step to the channel you will want for your new found frequency. (We will use Channel 20 for reference, assume we have stepped to Channel 20 and the search started.)
Let's say the unit has stopped on 140.995MHz.
Press "E" to enter the new found frequency into Channel 20. As soon as "E" is pushed, the unit will resume searching. This can be done to any channel.
After putting a frequency in channel 20, you certainly don't want to put another one in on top of it. So - go to "Scan", then "Manual" and step to your next selected channel. Press "Search again and repeat the above process for the new channel when another active frequency is found.
Now to listen to those new found frequencies, manually step unit to the channel you wish to monitor. The unit will display "Error". Press "E", it will now be displaying the frequency you saved and will listen to the transmissions on that frequency. You must repeat this process each time you wish to monitor an out of band frequency you've stored.

BEARCAT 220: INCREASED SCAN DELAY.....

If you own a BC220, you know the frustration of trying to listen to an exciting conversation. You hear one station transmit/unkey and "almost" 1 second later the scanner takes off! You've missed the answer!
The selective scan delay in the BC220 is an internal function of the microprocessor. What this means is that you can't just change a capacitor and lengthen the delay. Now for the solution to this problem.
BUT, there is a drawback - your 'Priority' feature is useless. When it jumps back to check the priority channel it stays there the length of the delay. The great feature of this modification is that it can be used with and without the selective scan delay feature of the BC220.

For starters, Bearcat's IC2 labeled 'B531' on the schematic, and SC8780P, H1841 in the parts list appears to be nothing more than an MC3357P. So with this in mind, we can proceed to our modification.

1. Refer to Fig. B. Locate R74 and Q15. (R74 is coming from pin 13 of IC2, Scan Control.)

BEARCAT 220: INCREASED SCAN DELAY...(Cont.)...

2. Refer to Fig. A. This is the circuit we will be constructing.

3. Refer to Fig. B., and locate T2. Connect the emitter of a 2N3904 to the case of T2, with transistor package leaning towards Q15.

4. Connect 4.7K resistor to C60 side of R74. Hereafter referred to as "RA".

5. Connect the other end to base of 2N3904 installed in Step 3.

6. Connect a 2.2K resistor; hereafter referred to as "RB"; to RA/R74 junction so that the RB and RA resistors are both now connected to C60 side of R74.

7. Connect other end of RB resistor to collector of 2N3904.

8. Drill a ¼" hole in rear of unit close to top; but be careful; as the top must still fit when finished.

9. Mount a SPST switch in hole, solder two 6" wires to terminals.

10. Run wires from switch through hole in board next to battery holder, then to component side of board.

11. Connect 330Mfd capacitor; negative to RB/2N3904-collector junction.

12. Connect outside terminal wire from switch to positive side of capacitor.

13. Connect center terminal of switch to R74/Q15-base junction.

14. Melt some wax over the components to hold them in place.

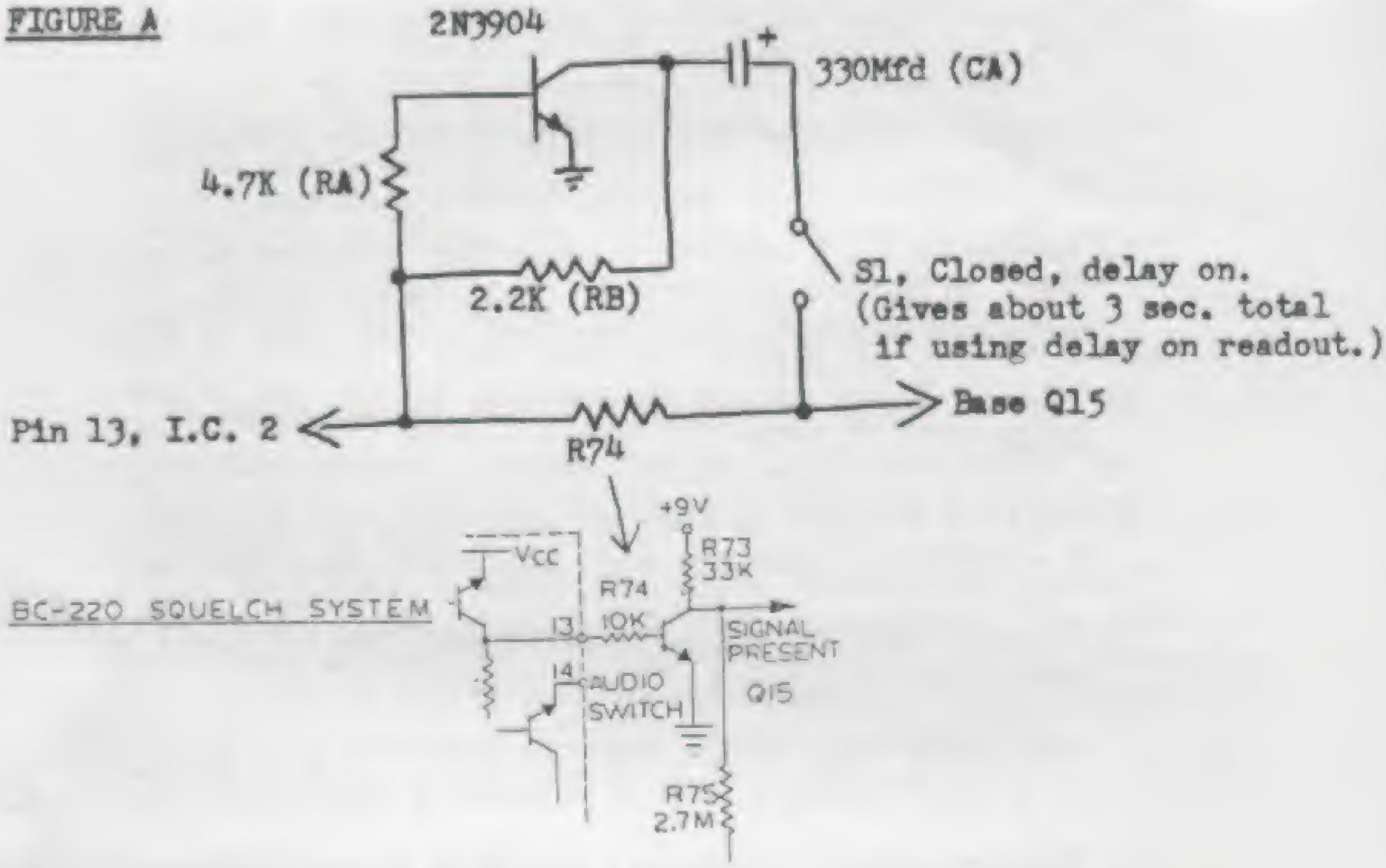
15. Re-install covers after checking all solder joints, etc.

What we are doing is switching the 330Mfd capacitor in/out of the scan control circuit.
We don't want to have it in circuit before it receives a signal because it would take the "Delay Time" to stop the scan and by that time we're at a 'different' channel.
So what we want to do is switch the capacitor in when we stop the scan. Therefore we only delay "Scan Start".
Without "RB" in circuit, there is enough residual ground d through the transistor to partially put "CA" in circuit. It's enough to effect our "Scan Stop" signal. It has to charge CA before it can stop the scan. This means we never receive anything.

BEARCAT 220: INCREASED SCAN DELAY...(Cont.)...

Parts List: 2N3904 (1)
330Mfd/16V Axial Electrolytic Capacitor (1)
2.2K ¼W resistor (1)
4.7K ¼W resistor (1)
SPST miniature switch (1)

FIGURE A



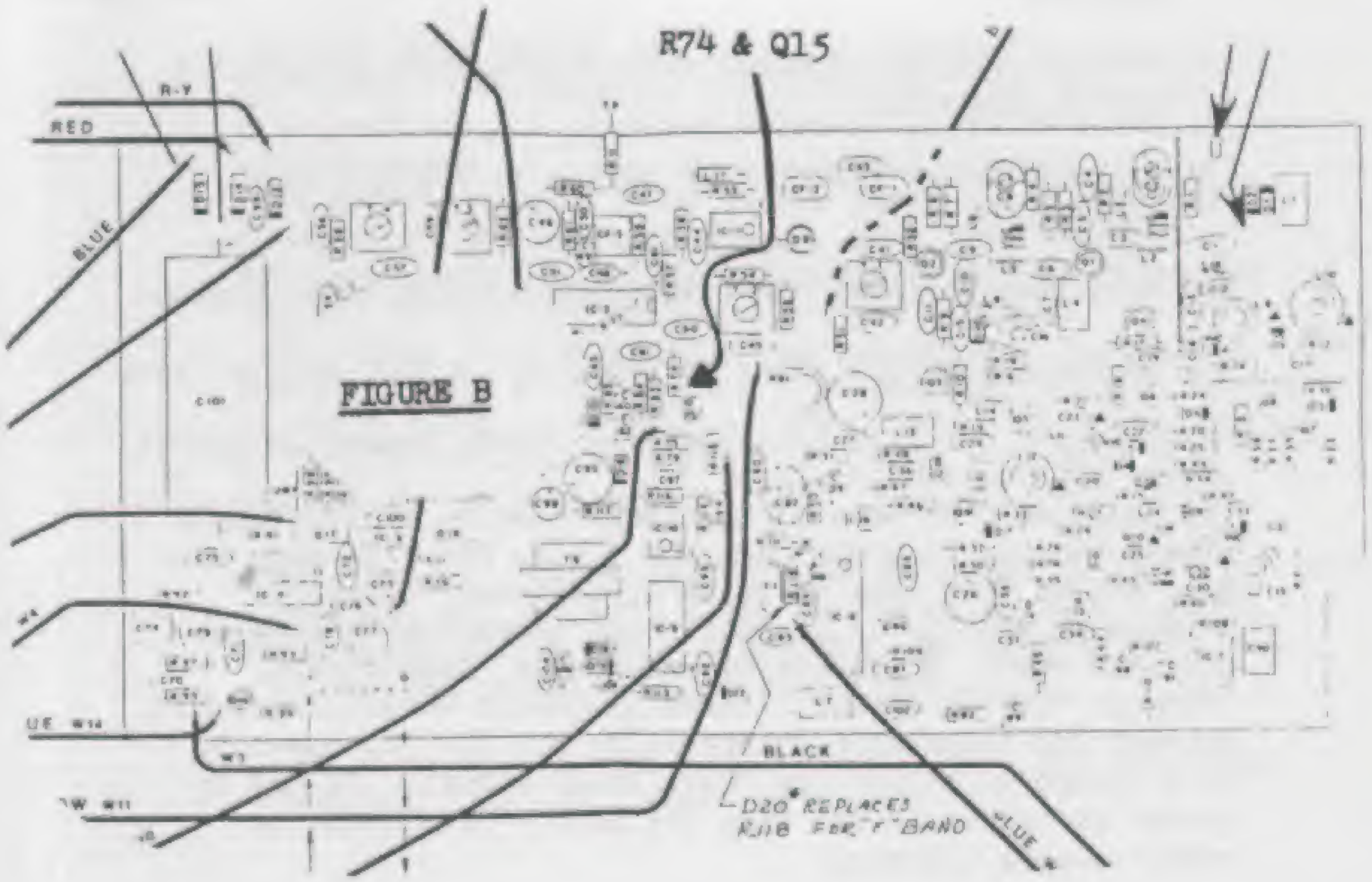


FIGURE B

SCANNER TRICKS.....(Cont.).....

FOX BMP 10/60: INCREASE SCAN DELAY ... PCB No. X-2695-05 REV-G
(Next to readout; top of PCB)

1. Remove 6 screws in bottom cover. 4 are under the rubber feet which may be peeled off to reveal the screws. Place them on a piece of wax paper; adhesive side down; so they can be reused.

2. Separate the covers.

3. Remove the flat cable from the PCB by pulling it out of the connector on the PCB.

4. Unsolder the two speaker wires at the speaker.

5. Remove the 4 screws - holding the PCB in place; at each corner; these are accessible from the top. Remove bottom cover from PCB.

6. Remove the metal shield covering part of the PCB by unsoldering it at its corners.

7. Locate I.C. 1A and the components shown in Figure 1.

8. Drill a mounting hole for your new switch in a convenient place on the front panel and mount the switch.

9. Carefully connect the compnents together to form the circuit shown in Figure 2. After they have been soldered in place, use some Elmer's Contact Cement to hold them in place. Pay attention to the location of the cover center post. (One of the screws go in it - and easy to get a new component in the way of this post preventing the covers from going back in place.)

Once this has been completed and double checked, power the unit up and check it out. Notice that a short transmission or a burst of noise does not cause the unit to delay, one of the features of this circuit. (Switch closed = delay ON).

After you have verified operation and are satisfied that all is okay, remove power and reassemble the unit in reverse order of disassembly. NOTE: Look at the end of the FLAT cable. If the contact areas have been scraped off by connector J1. Use scissors and cut off the areas that have been scraped off by cutting across the cable, shortening it by about 1/16".

The 330Mfd capacitor gives about 3 seconds of delay. Decrease value for shorter delay time/increase for longer.

PARTS LIST: 2N3904 transistor; 330Mfd electrolytic capacitor; 2.2K ¼W; 4.7K ¼W; and SPST miniature switch..

SCANNER TRICKS.....(Cont.).....

FOX EMP 10/60: INCREASED SCAN DELAY...(Cont.)...

FIGURE 1

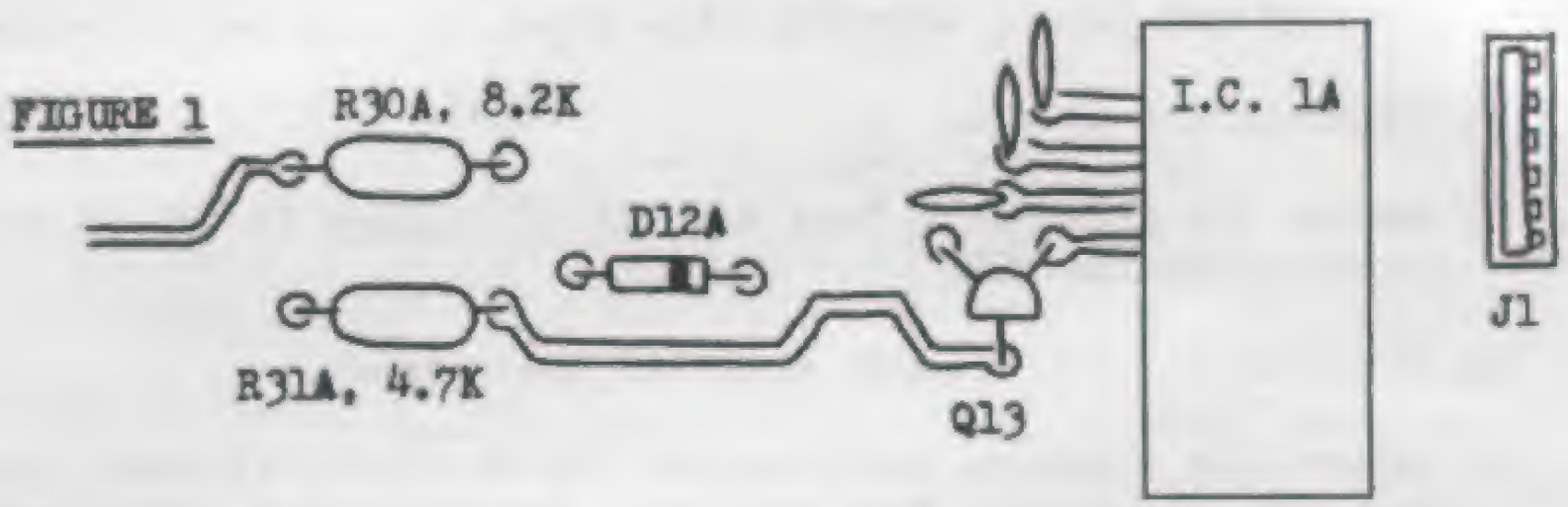
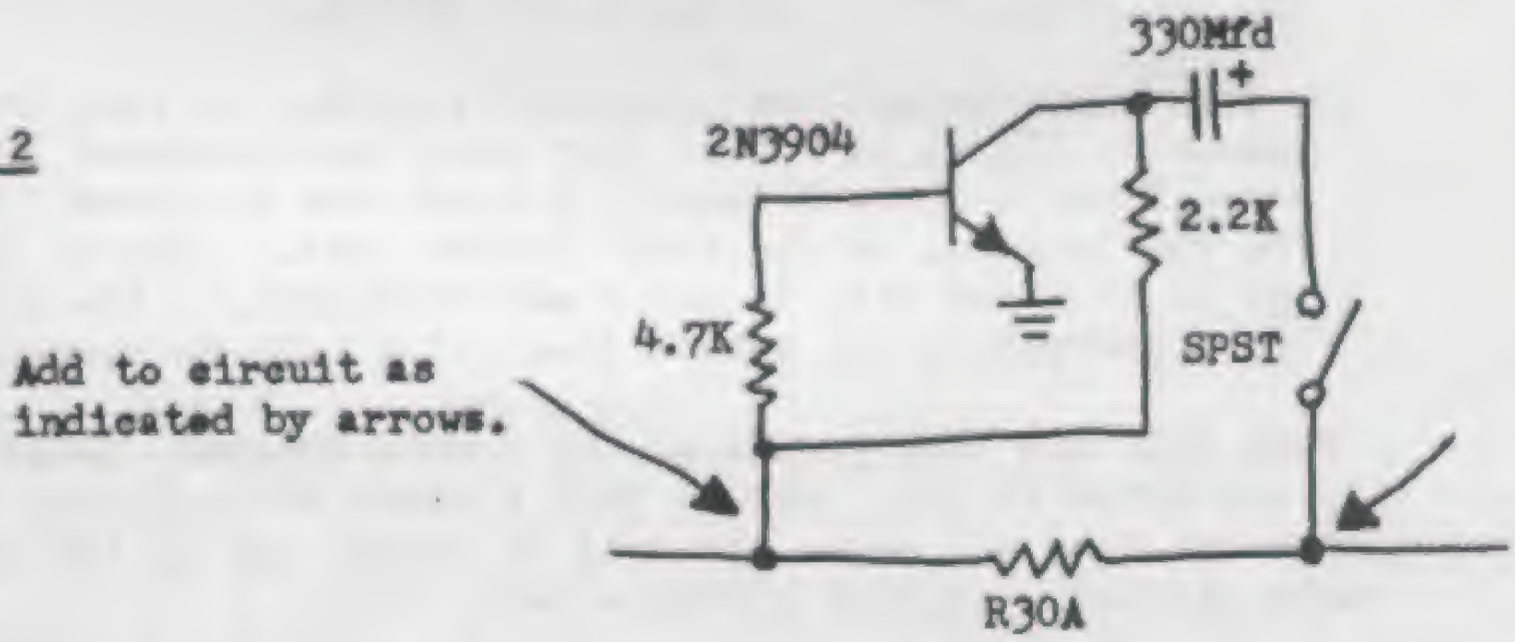


FIGURE 2



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TECH TIP

If you clip the AMC diode you have high transients. This exceeds the working volt (WVDC) of many of the audio circuit capacitors. This continued action will deteriorate the quality of the circuit over a period of time. Could be the problem with sluggish and/or slurred sound or soft & mushy sound.

****
****

TECH. TIPS

Cobra 142GTL: Modulation - Remove TR32 and R186, will open it up!

PLL02A: Modulation - Remove the adjust pot VR2/102 and R166/58 (these reference numbers depend on the PCB). The latter located next to audio chip heat sink.

Jackson (Export): Modulation - Remove TR26, will give some additional audio, but will not open it up all the way...

SQUEAL CURES
by D.A.

The only time you would expect a squeal is when you have a 'power mike' - here are some simple remedies:

Squeal from speaker in transmit when mike volume turned up... Use a 12V SPST relay. Connect one end of coil to the switched 12VDC at the On-Off switch. The other end of coil goes to either of the following.

A. If relay is normally open hook it to the receive control of the mike plug inside the radio.

B. If relay is normally closed hook it to the transmit control of the mike plug inside the radio.

Then disconnect one of the speaker wires, hook it to one side of the switch on the relay. The other side of the switch is wired back to where the wire was taken off the speaker.

SPECIAL NOTE: Before you attempt any of the above check to be sure that is the real source of squeal, by removing a wire from speaker.

Squeal on receive when mike volume is turned up... Same procedure as above with the following changes for 'A' and 'B': Relay normally open, hook it to transmit control. Relay normally closed, hook to receive control. Follow same procedure as above in hooking up mike audio input to relay switch. "Object of this is to physically disconnect the audio wire when not transmitting." NOTE: Same as above, disconnect first to be sure that is problem.

(ED. Note: Also consult SCB Vol. 3, pgs. 26-32.)

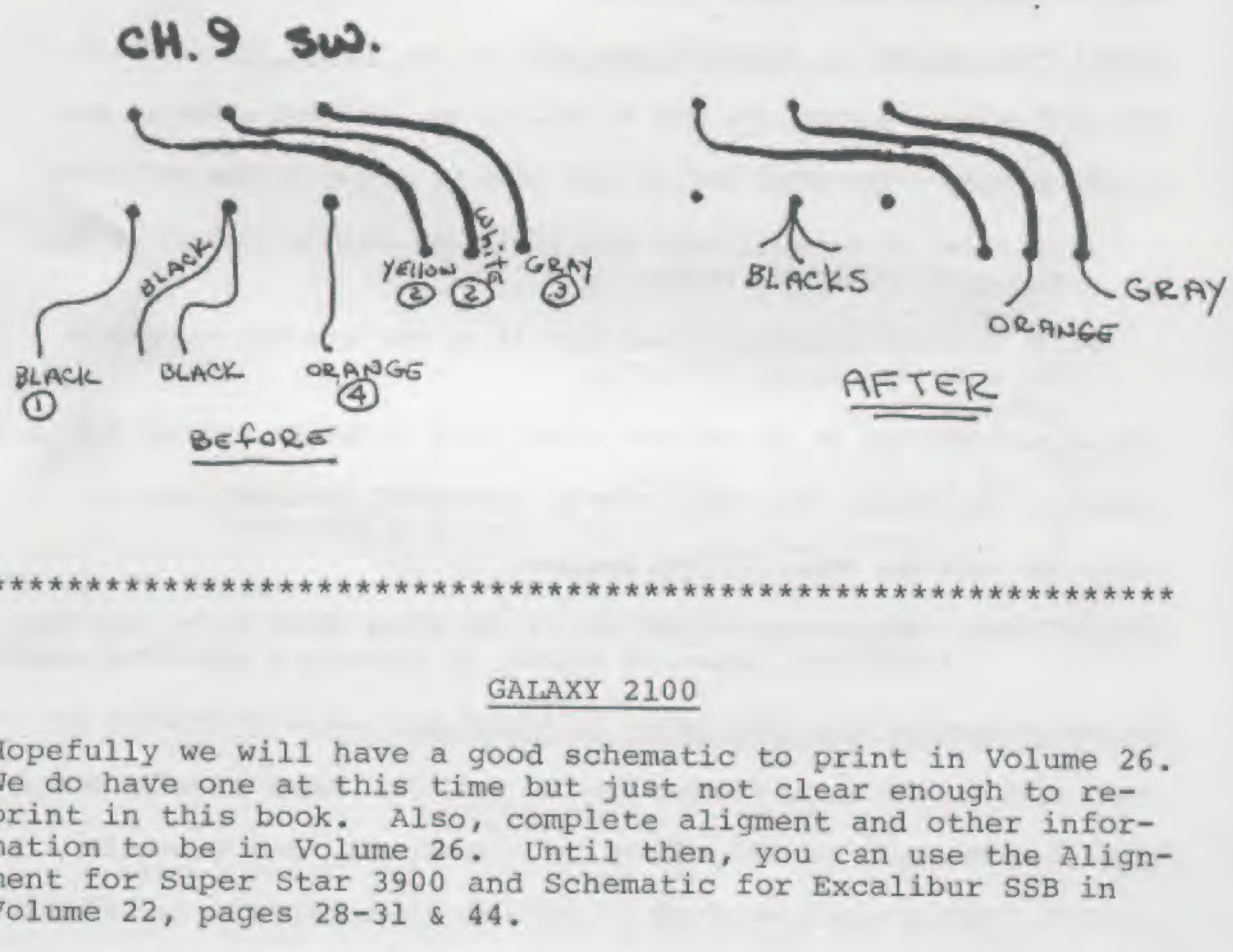
GALAXY 2100 DE-BEEP

JS

1. Remove RED wire from JP9 (front R/H looking down at component side)
2. Remove JP9.
3. Solder RED wire back into hole next to edge of PCB (8V).

IF USING CHANNEL 9 SWITCH CONTINUE WITH NEXT 4 STEPS:

4. Move single BLACK wire to junction w/other 2 BLACKS.
5. Remove WHITE and YELLOW and solder together.
6. Remove GRAY wire at point 10. Move to RED wire that was at JP9 (8V).
7. Remove ORANGE wire completely and solder ORANGE wire where WHITE wire was.



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GALAXY 2100

Hopefully we will have a good schematic to print in Volume 26. We do have one at this time but just not clear enough to re-print in this book. Also, complete aligment and other information to be in Volume 26. Until then, you can use the Alignment for Super Star 3900 and Schematic for Excalibur SSB in Volume 22, pages 28-31 & 44.

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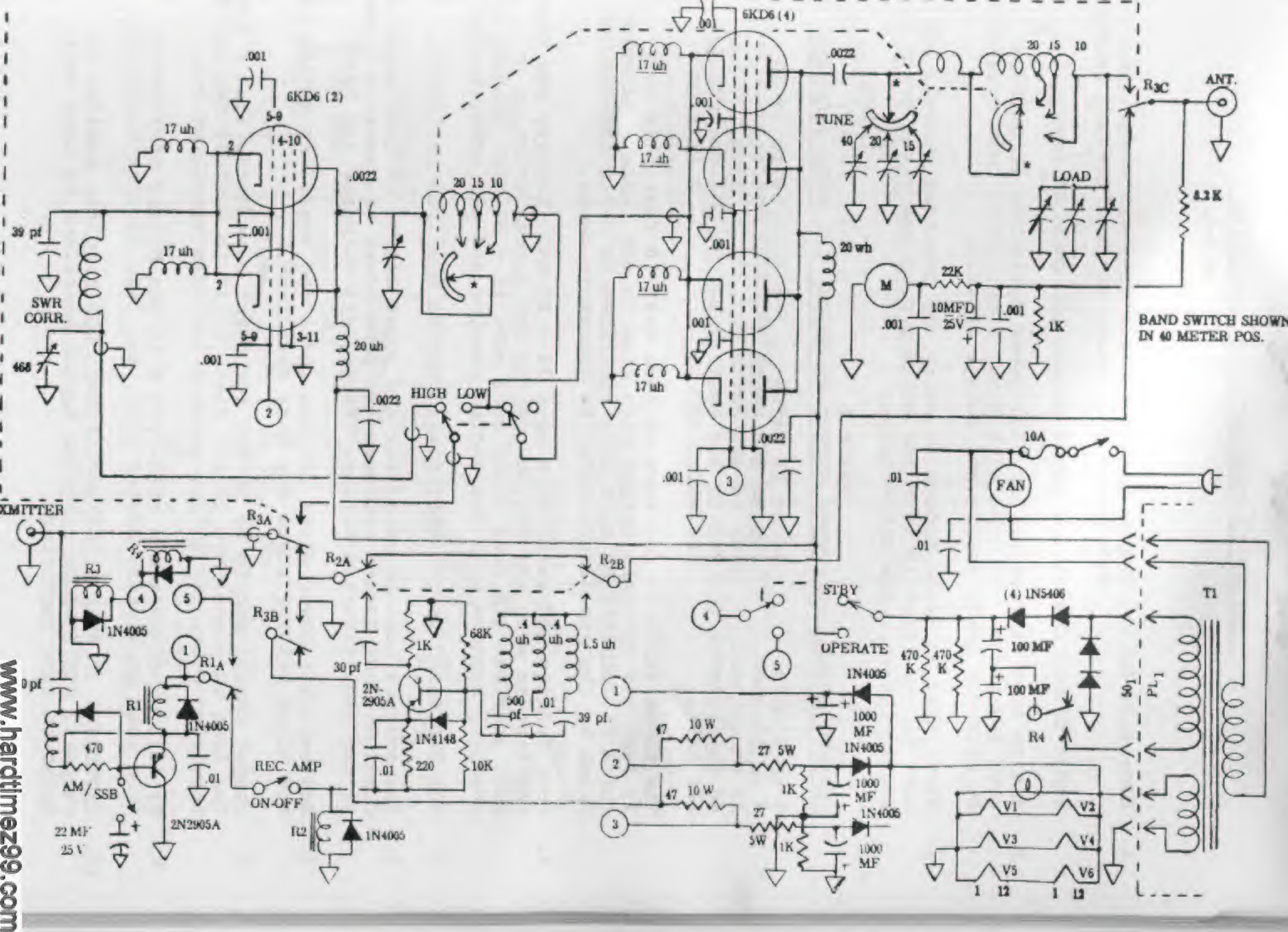


THINGS TO KNOW ABOUT AN AMPLIFIER

by G.L.

1. **Excessive Drive:** Causes poor audio and downward modulation. Modulation only shows on peak reading wattmeters.

   Under Drive: Causes low power output and poor RF keying.

2. Engine must be running for full power operation in mobiles over 100 watts. If used with power supplies in base operation be sure the power supply has enough amperage.

3. Wires must be large enough to carry the required current and must be run directly from the battery plus and minus posts to the amplifier. See table below:

TABLE I

CURRENT DRAWN	POWER OUTPUT RF WATTS	WIRE REQUIRED
5 to 8 AMPS	50 to 75 WATTS	14 to 12 GA.
8 to 12 AMPS.	100 to 200 WATTS	10 GA.
20 to 40 AMPS.	200 to 400 WATTS	8 GA.
40 to 60 AMPS.	200 to 400 WATTS(TUBE)	4 to 6 GA.
100 AMPS.	500 WATTS AND UP	2 to 4 GA.

The above table is for runs of less than 10 feet. If over 10 feet use the next larger wire size in the table. If using quick disconnects be sure they are rated to carry the current drawn by the amplifier; refer to the above table.

4. Most foreign and small cars have 30 - 45 AMP. battery and charging systems with the engine running and airconditioning on. Most american and full sized cars have 45 - 65 AMP. battery and charging systems with the engine running and air conditioning on.

5. 400 Watts and larger amplifiers require multiple batteries.

6. The antenna must be rated for the power output of your amplifier. CAUTION: Base loaded antennas are poor power handlers in spite of any manufacturers claims. Fiberglass antennas are best.

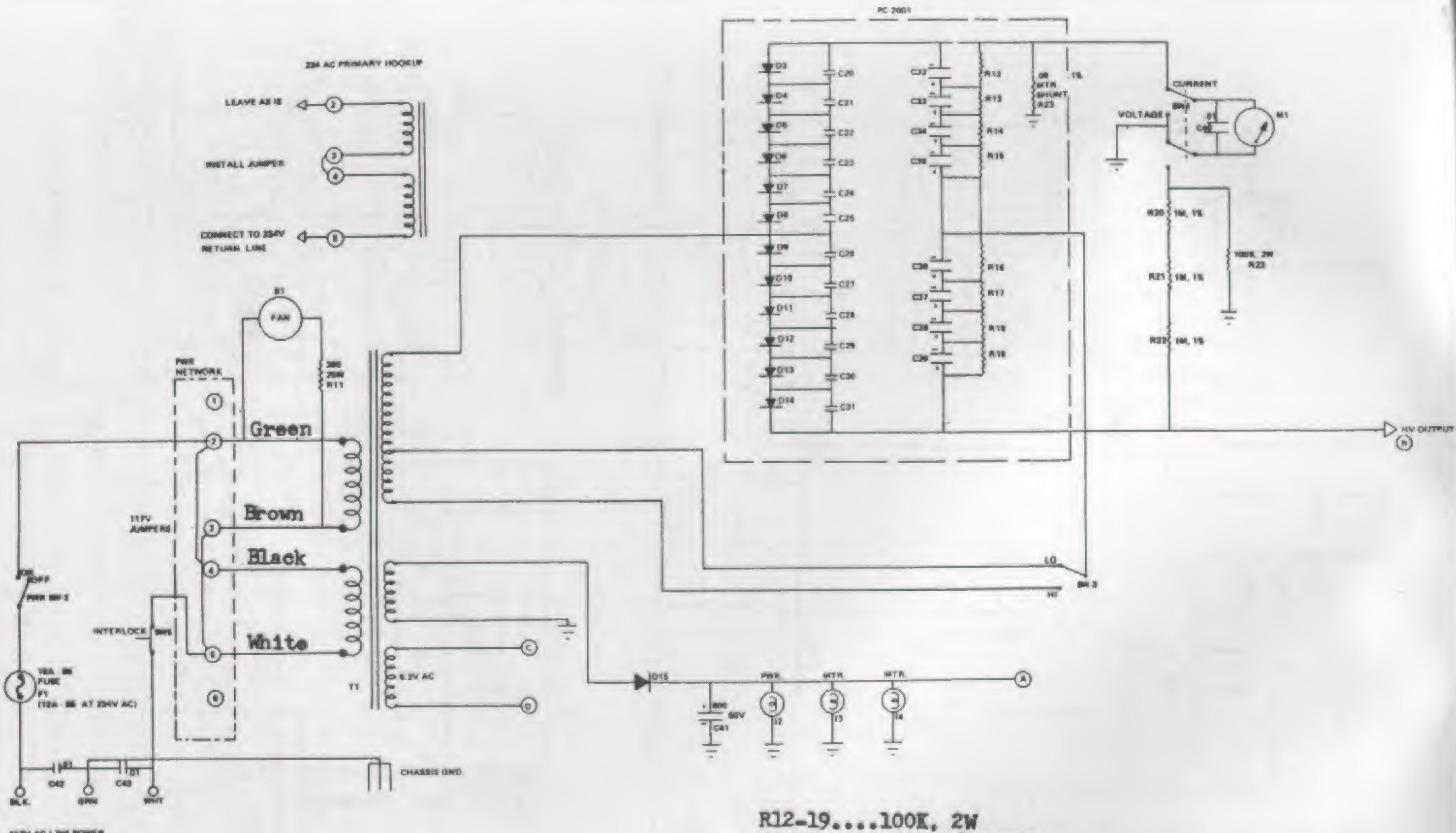
7. Run separate power wires for the radio and amplifier to the plus and minus battery posts for best operation.

8. Jumper cables should be RG-58U for short runs (Less than 4 feet). for long runs use more than 7 feet; 11'4" is perfect for solid insulated coax, 13' 11" is perfect for Foam insulated coax.

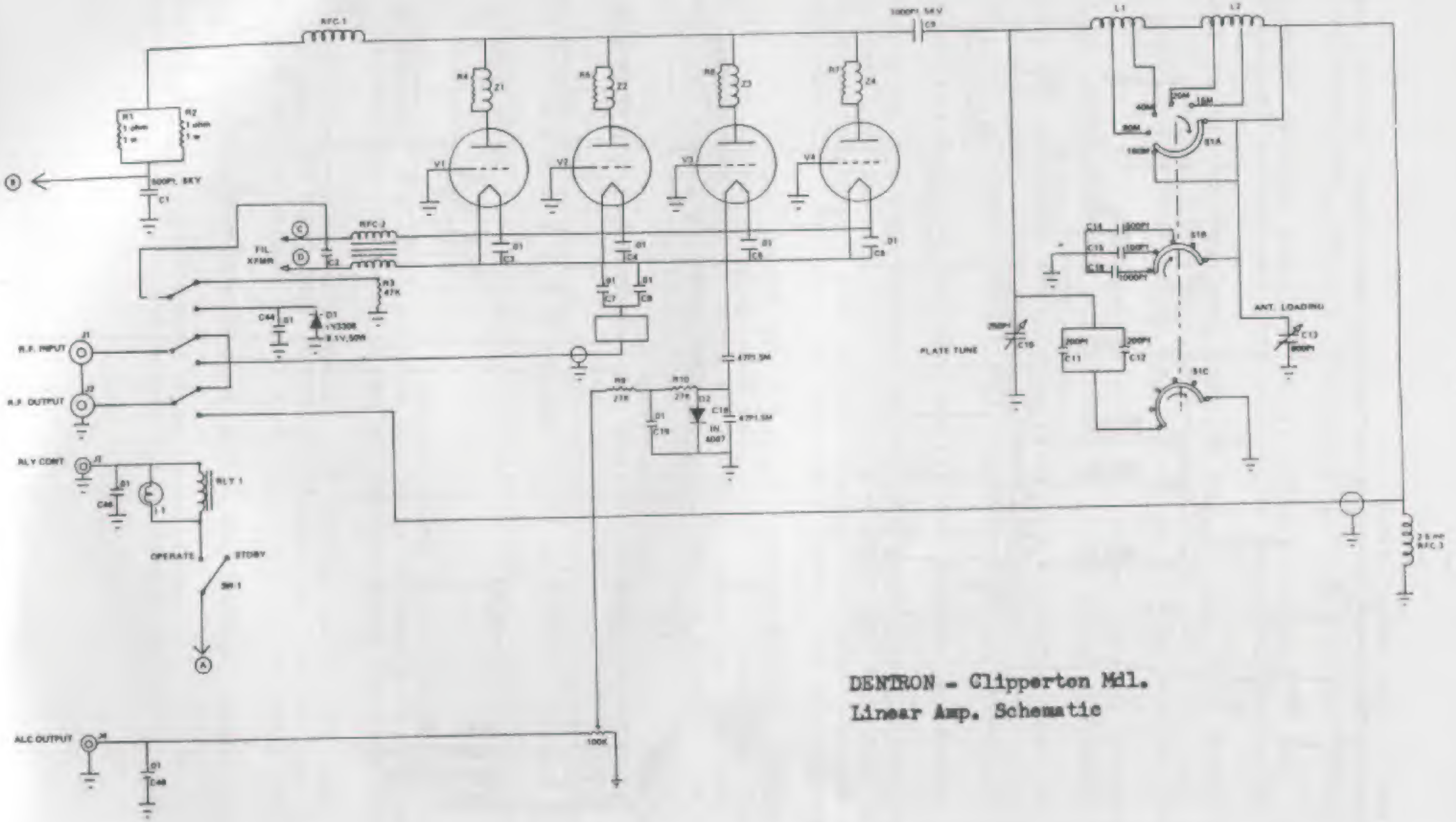
9. By following the above rules you will get better performance from your amplifier, longer life, and less service headaches.

10. CAUTION:.....HEAT KILLS AMPLIFIERS! DON'T: Clamp mobiles to carpets, DON'T block air flow around heatsinks or into vent holes on tube amplifiers.

DENTRON - Clipperton Mdl.
Linear Amp Power Supply Schematic



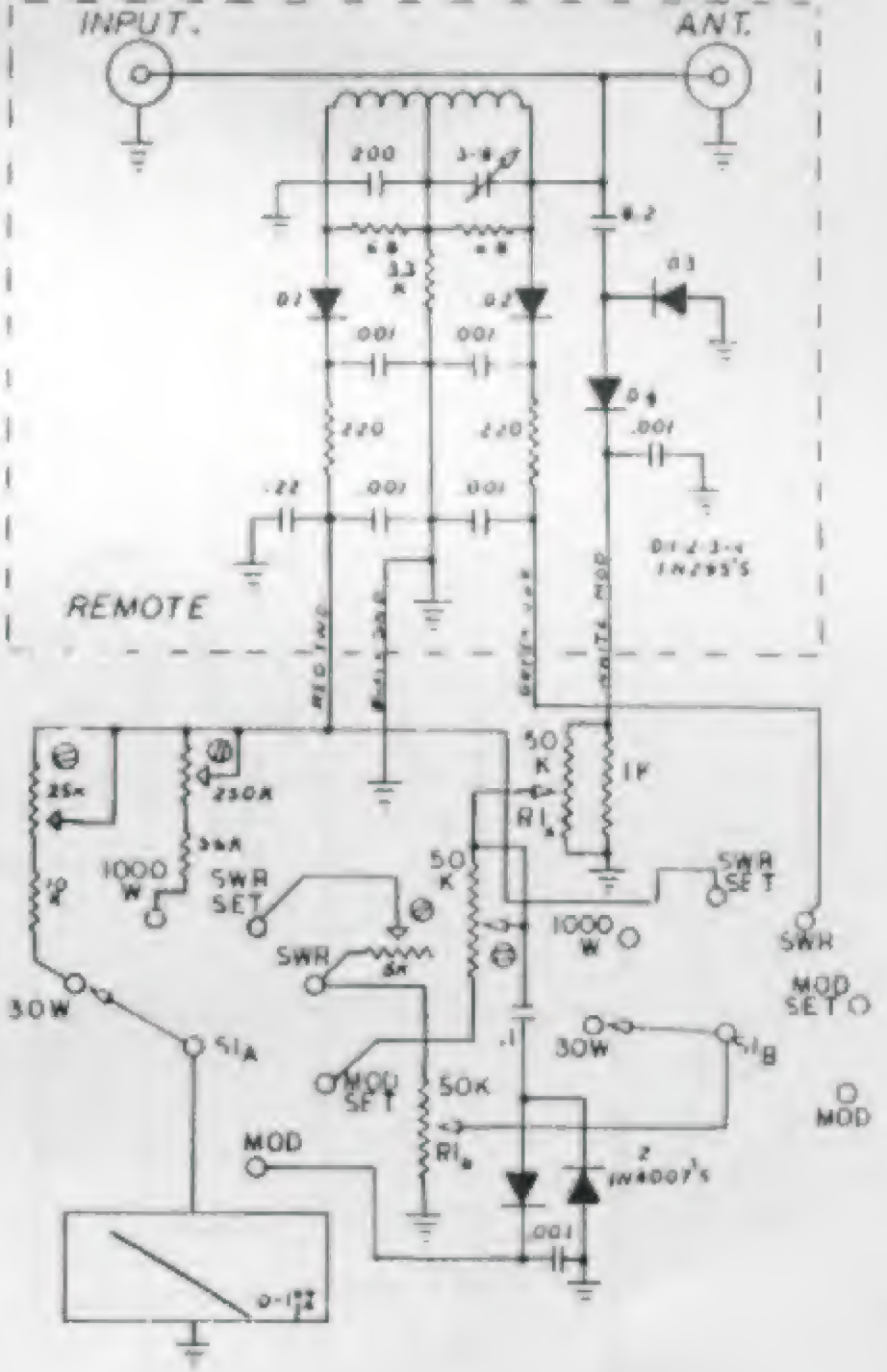
R12-19....100K, 2W
C32-39....100MFD/500VDC
C20-31.. .01MFD/500V
D3-14..... M405



DENTRON - Clipperton Mdl.
Linear Amp. Schematic

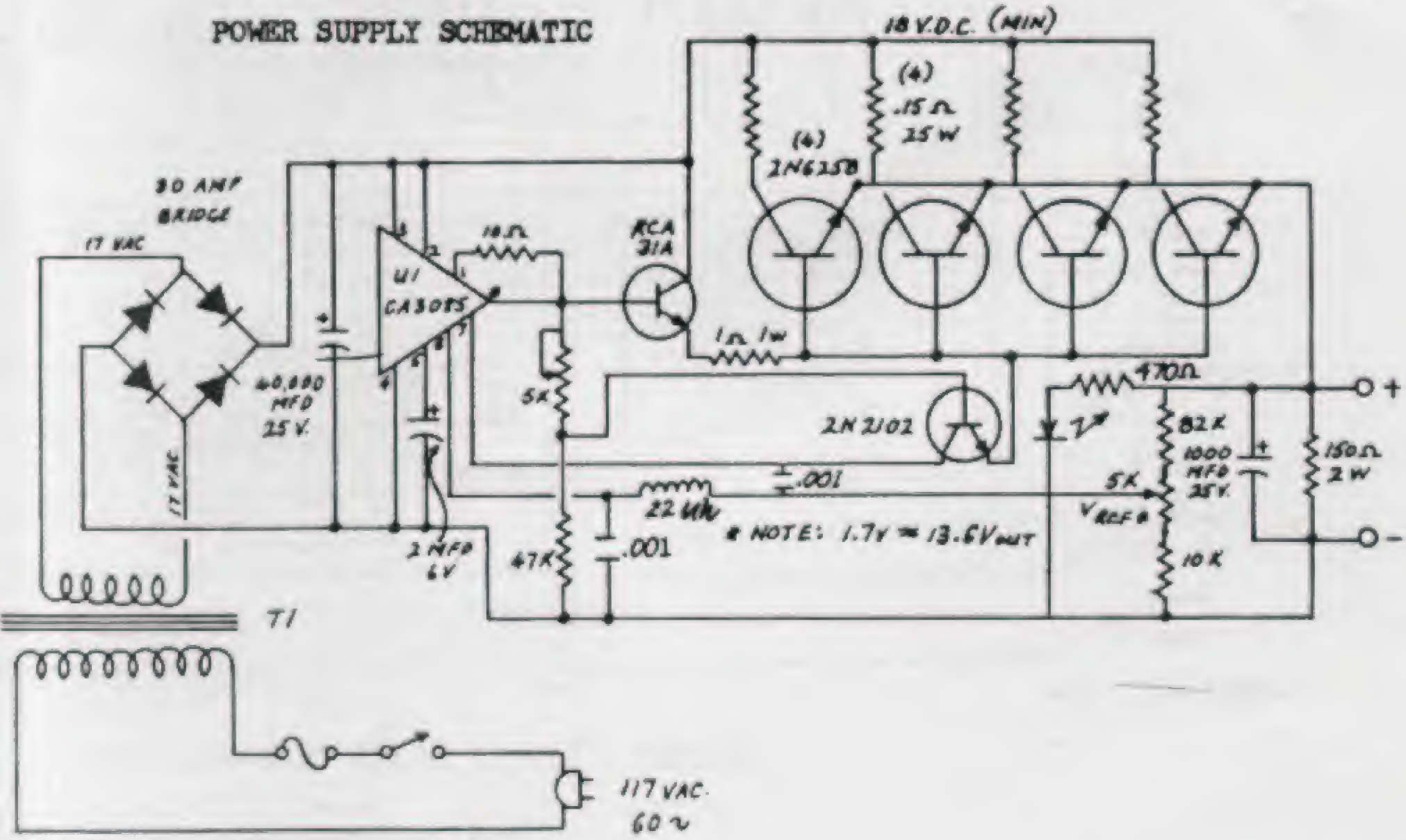
DOSY Mdl. TR-1000

Meter Schematic



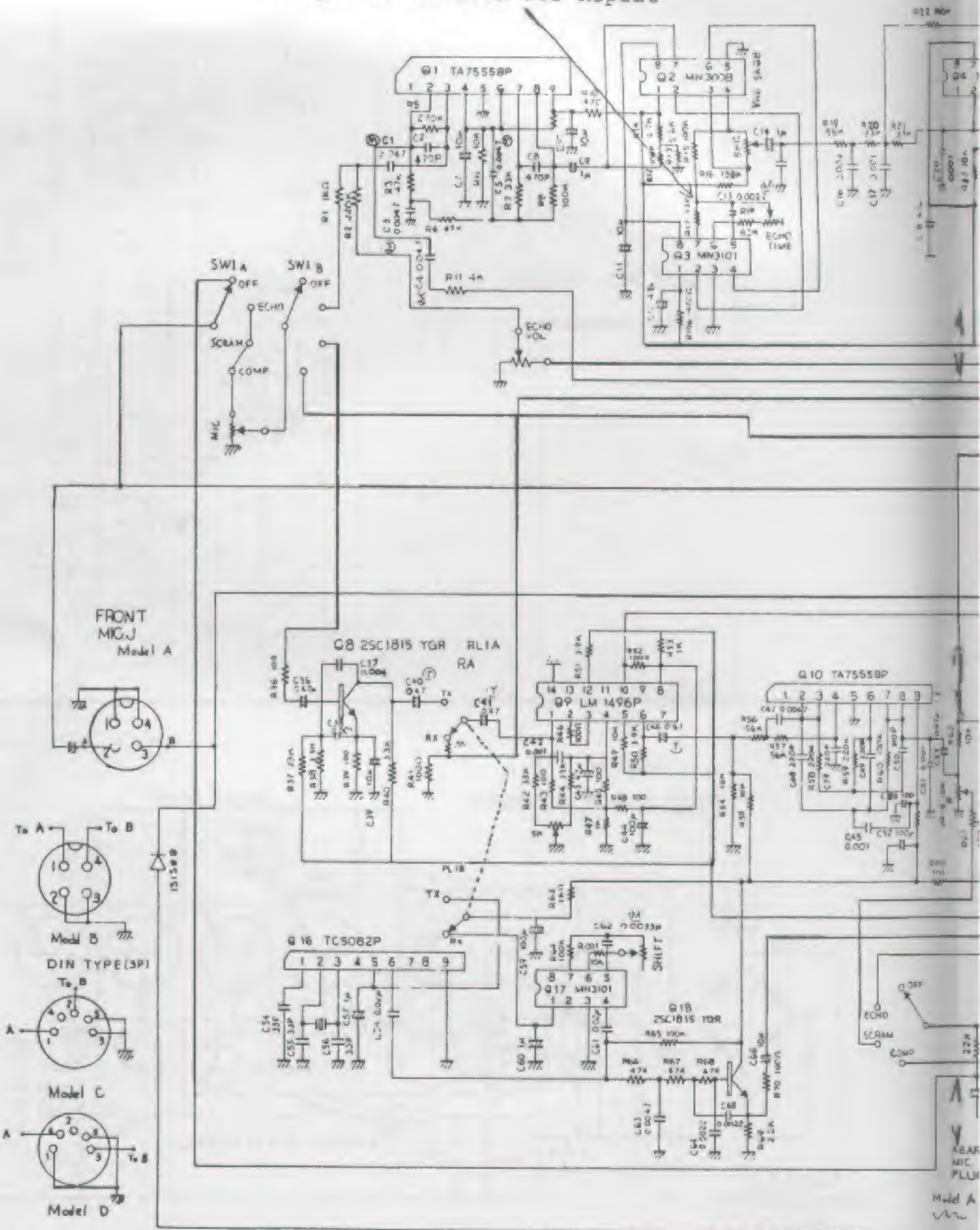
PALOMAR DC30

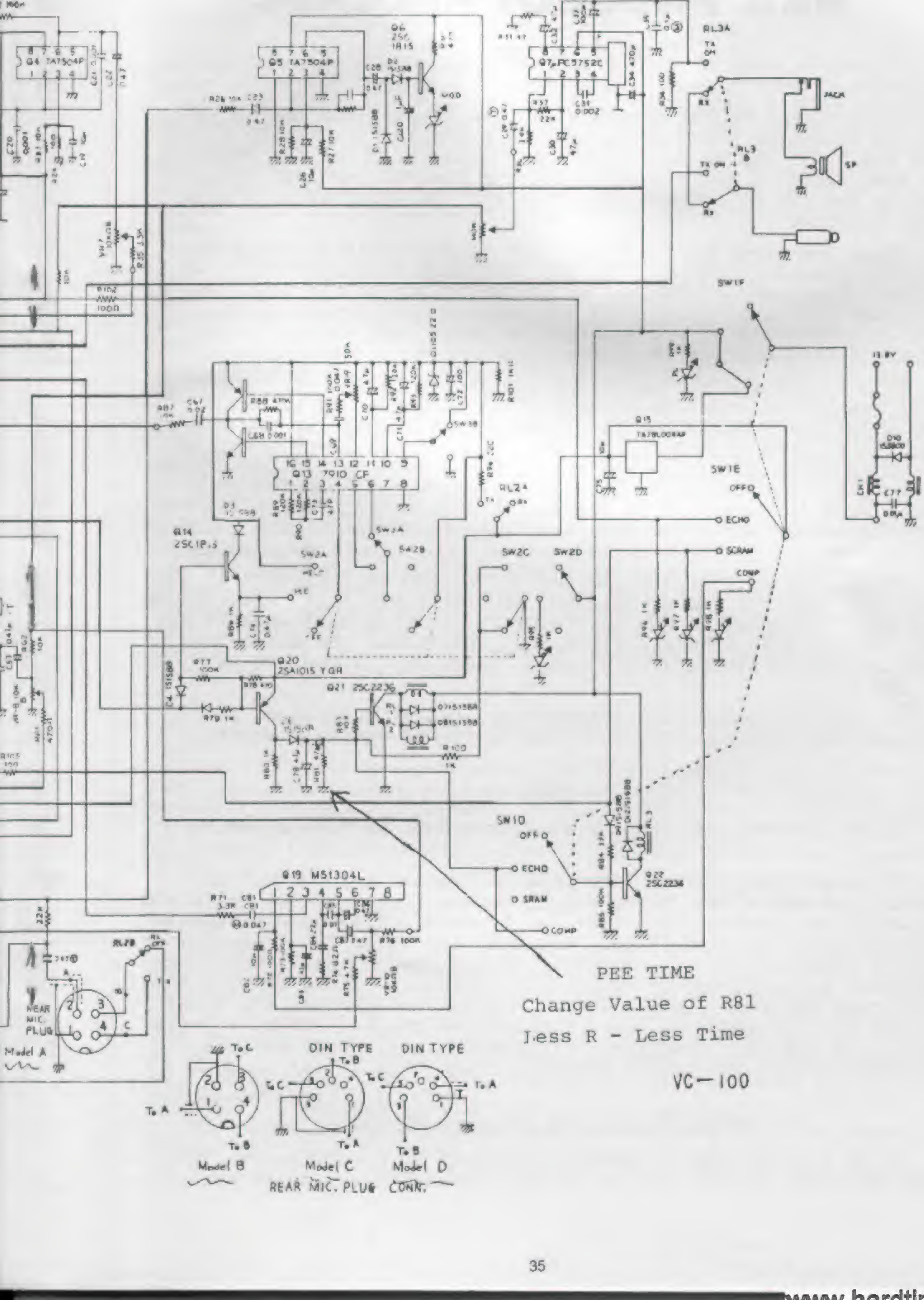
POWER SUPPLY SCHEMATIC



ECHO TIME

Change R17 to 100K for Repeat





PEE TIME

Change Value of R81

Less R - Less Time

VC—100

NEW PRODUCT RELEASE

"LTD KIT BY CARD KIT"

We are aware of the problems you are having with the "B" Kit. We too find that often after splitting the 1st IF between 10.695 Mhz and 9.785 Mhz we could not satisfactorily boost the receiver on some types of units to maintain the desired receiver gain. So, we set out to correct this problem. We ended up with more than expected.

There has never before been a kit so versatile in usage for the 77 type chips as the LTD KIT. Although it is versatile in usage, at present it is limited to the UNIDEN boards which use a separate VCO circuit and FETs for mixing. Still this covers approximately 70% of all straight AM Units sold in the United States during the past 5 years.

This is how the kit works and the theory behind it. Starting with the VCO or Local Oscillator (L O) frequency as it exist. The signal will vary from 16.270Mhz thru 16.710Mhz as the selector is rotated from channel 1 thru 40. This signal beats with the incoming RF to give a 1st IF of 10.695Mhz for the desired channel frequency. For instance- Channel 26 (27.265Mhz) requires a Local Oscillator frequency of 16.570Mhz. The difference being 10.695Mhz. This 10.695Mhz 1st IF is then beat with 10.24Mhz to give a 2nd IF of 455Khz.

If we take this 16.570 (LO for ch 26) and beat it with 20.935 Mhz, and take the sum of the two, we will have 37.505 Mhz. If we use this frequency as our LO frequency, it will beat with 26.810 Mhz to give a 10.695Mhz difference. This makes the selectable frequencies 26.510 thru 26.950Mhz. These are called LOW HALF CHANNELS.

To transmit these same frequencies, all we have to do is prevent the PLL Chip from shifting up 455Khz during transmit.

NOTE

If we use the modification in this manner we have an extra bonus.

If we put the switching for the LO frequencies through one switch and the 455Khz switching through an other we can split the receiver and transmitter. That is, if we disable the PTT signal (455Khz shifting signal) but, yet keep the 16Mhz VCO frequency as our LO frequency we will transmit on LOW HALF channels while our receiver is still receiving regular channels. If we reverse this condition and keep the PTT signal operational and use the 37MHz as our LO frequency, we would transmit on regular channels while receiving LOW HALF channels. If anything approaches PRIVATE CHANNELS within the usable range of a CB, this is it!

USING THE KIT FOR LOW FULL CHANNELS

If we use the same 5K OFFSET procedure as used with the "A" and "B" KITS, it will put us on full channel frequencies for

transmit but we will be off on receive. So we must retune the Epoxy Pack. For instance on channel 26, we will need to change the New LO frequency from 37.505Mhz to 37.5117Mhz. Half of this will be accomplished by offsetting of the 10.24 Xtal and the rest by tuning the Epoxy Pack Xtal frequency from 20.935Mhz to 20.9383 Mhz. As you can see, on the Epoxy Pack we have used a direct frequency Xtal of 20.9366Mhz. The two frequencies desired are on either side of this frequency and within the stable range of the Xtal.

On FULL LOW Channels we now have (on ch 26) a LO frequency of 37.5117Mhz. This beats with 26.815Mhz giving a 1st IF of 10.6967 but, remember the 10.24Mhz has now been changed to 10.2417. Now 10.2417 beat with 10.6967 produces the desired 2nd IF of 455Khz.

After we found a low kit that satisfied our need, we started looking for a HIGH KIT that would be compatible. Just as the "B" KIT was designed to be compatible with the "A" KIT. To our surprise, it turned out that the NEW LTD KIT was its own compatible high kit. That is, if we lock the PLL Chip in its normal transmit position the LO frequency would be 16.725 thru 17.165Mhz. Which gives us a 10.695 1st IF from frequencies 27.420 thru 27.860Mhz (ch 41½ thru 85½).

This same change in the VCO when combined with the 20.935Mhz would generate frequencies 37.660 thru 38.100Mhz. If we replace the VCO input to the TA7310P Chip used to generate the transmitter frequency with this 37Mhz signal, we found that it would select the difference between the 37Mhz signal and the 10.24Mhz input just as well as it selected the sum of the 16Mhz and the 10.24Mhz inputs. This gives us transmitter frequencies of 27.420 thru 27.860 or HIGH HALF Channels.

USING THE KIT FOR HIGH FULL CHANNELS

Again if we use the already established method for 5K offset, the receiver would be shifted automatically. The VCO output would be 16.7283Mhz thru 17.1683Mhz. This would produce a 1st IF again of 10.6967Mhz. Like before, when beat with 10.2417Mhz (offset 10.24 Xtal frequency) would give the desired 455Khz 2nd IF.

Like before the oscillator on the Epoxy Pack would have to be retuned. Using Ch 26 again, the output of the 37Mhz Amp. would be set to read 37.9667Mhz.

Since the 5K offset and the adjustment of the VC on the Epoxy Pack both effect the frequency of the transmitter. Proper adjustment of the 5K requires that it be measured independantly. This can be accomplished by adjusting the 5K offset VC while observing the VCO output at TP-3 (the input to the 1st IF Mixer FET). While on Ch 26 and switched to HIGH FULL Channels adjust for a reading of 17.0283 Mhz. Then adjust the VC on the Epoxy Pack for a transmitter reading of 27.725Mhz.

By now you might have observed that on both LOW FULL Channels and on HIGH FULL Channels, the oscillator on the Epoxy Pack is set to the same frequency (20.9383). Also, on LOW HALF Channels

"LTD KIT" by CARD KIT continued:

and HIGH HALF Channels it is set to the same frequency (20.935). If you have observed this then you've probably guessed that this kit can be used as a LOW and HIGH FULL Channel kit, or a LOW and HIGH HALF Channel kit. Now you see the versatility of this kit as mentioned earlier. All that is needed is a four pole-three position switch for LOW & HIGH HALF Channels or a five pole-three position switch for LOW & HIGH FULL Channels.

Since this kit is so versatile and the switches to be used depend on the user's own desire, it was decided that switches will not be made a part of the kit. The switches you desire for your application will be made available by SELMAN ENTERPRISES or CARD KIT.

Since the detailed installation instructions are so long and varried, packaging a complete set with each kit sold would make the price too high. Any repeated user of the kit would only be paying for printing that he would be discarding anyway. To cut waste and save on your cost per unit, CARD-KIT through SELMAN ENTERPRISES devised a method of providing these instructions on a one time bases by printing them in this volume of SECRET CB.

Below you will find a Proof of Purchase coupon. Use it and the $2 discount coupon from a kit to obtain a $2 discount on your next order from SELMAN ENTERPRISES. If a person should purchase a kit and has not yet bought a Volume 25 of SECRET CB, then the kit will instruct him to mail the coupon for a $2 discount on a Volume 25. In this case the Proof of Purchase coupon will be voided before the Volume 25 is mailed.

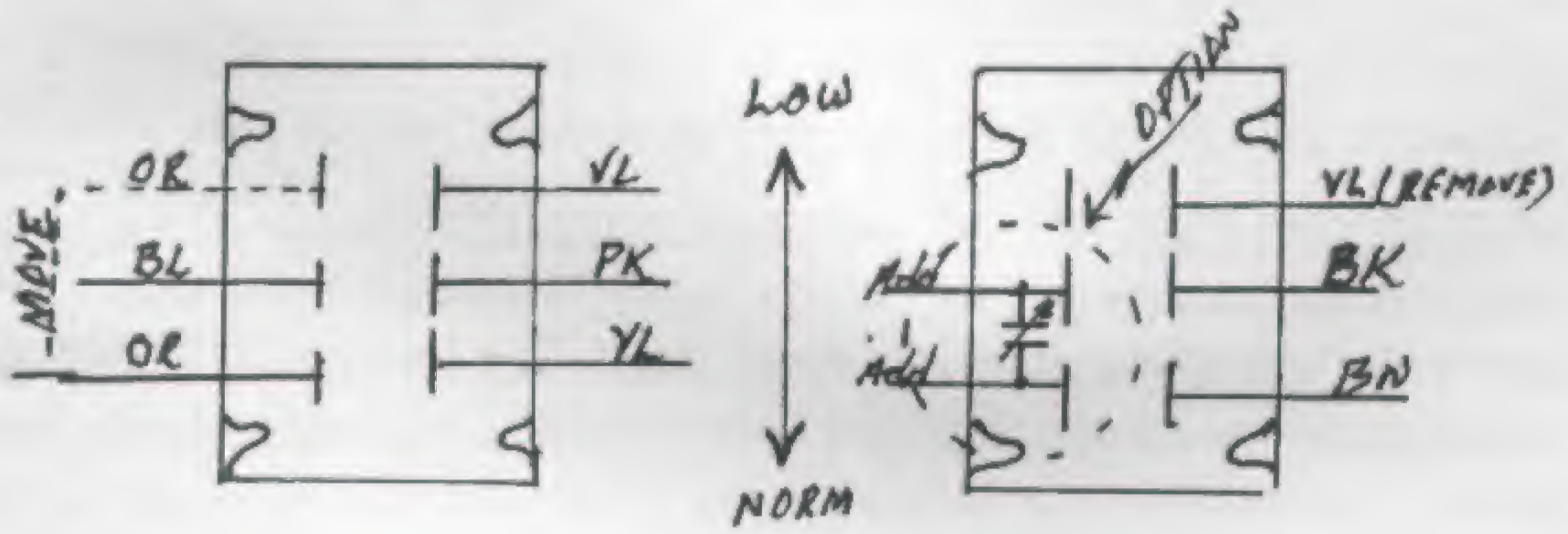
While we are on the subject of making tne kit economically affordable, there is one other thing we did to cut waste and reduce its size. The TA7310P Chip which we used to combine the 20.935 or 20.9383Mhz signal with the VCO frequency requires a regulated voltage of 4 to 8 VDC. It was not feasible to supply the Epoxy Pack with 13.8VDC and regulate it, especially since we have a regulated already available in the CB used as vdd or timing circuit voltage. When it came to the final amplifier we needed 13.8VDC. Since most of you will want to use the NB switch for one of the switches and the circuit would therefore be completely disabled, we decided to convert the amplifier section of the NB circuit to accomplish this task. All that is needed is a 37Mhz tank, which is included as part of the kit. The instructions as outlined in this volume are written around using the NB amplifier as the final amplifier for the NEW LO Frequency. For those who do not wish to use this amplifier a 37Mhz amplifier can be purchased from SELMAN ENTERPRISES or CARD KIT. These amplifiers will be available after 1 September 1986. Approx. cost of $5.95.

A CLOSING NOTE

The "A" & "B" KITS are still available for those wishing to use them. Of course they are still recommended for the units that are not as tight on their 1st IF.

"LTD KIT" LOW CHANNEL INSTALLATION INSTRUCTIONS FOR COBRA 21LTD/GTL, ANDREW J, AR/AX-44, PC-66, AND ANY SISTER UNITS

The following switch lay-out is for the color code on the Cobra 21LTD. For other sister units or earlier models, note in pencil the color code that exist on those switches and adapt the reading material accordingly.



USING THE TWO EXISTING SWITCHES:

1. Clip the yellow, also the orange wire coming from the transmitter section, just forward of the first zip tie forward of the power plug.
2. In this same area, unsolder the pink and the violet wires.
3. Use the short piece of yellow wire and solder it where you unsoldered the pink wire.
4. Just forward of the audio transformer and directly center from the audio chip, unsolder the blue wire. Solder in it's place the piece of orange wire that runs from the transmitter section.
5. To clear the channel 9 swtich, remove the violet wire from the switch.
6. Unsolder the brown and black wires from their respective PC boards.
7. Solder the violet wire on to the PC board where the black wire was removed.

INSTALLING THE EPOXY PACK:

1. Pull the chassis grounding tab, located just above the PLL chip, straight out.
2. Stand the wire, tape up against the selector.
3. Using silicone sealant adhere the epoxy pack to the chassis wall just forward of the pulled out tab, with the VC upward.

INSTALL THE FOLLOWING MISSING COMPONENTS:

R-101	- 10K	C-136	- .01uf
R-102	- 3.3K	TR-20	- use a 2SC1675 or a 2SC1923
R-103	- 1K	L-19	- install (supplied)

LOW CHANNELS FOR COBRA 21LTD AND SISTER UNITS CONTINUED:

1. Solder a 220 ohm resistor from the leg of R-105 to C-137 leg nearest L-19.
2. Solder in a jumper wire from W-26 to W-27.
3. Solder a jumper from ground to the rear leg of the secondary of L-19.
4. On the PC side of the board, solder a 470 ohm resistor to the remaining secondary leg of L-19 with its other leg run through and solder where the body of R-104 should be. Now pull the violet wire of the CB/ANL/PA switch out of two ties and solder it to this end of the resistor on the component side of the board, or through another hole in that same PC pad.

CONNECT UP THE REST OF THE CB/ANL/PA SWITCH:

1. Pull the yellow wire out of the zip ties. Measure the distance needed to reach the blue terminal on the epoxy pack. Cut the insulation and pull a bare spot. Now solder it to the hook terminal, blue dot, of the epoxy pack.
2. Continue the yellow wire underneath the board (printed side) to the output secondary leg of L-16. Cut this same run just before the empty hole on the run.
3. Pull the pink wire out of the zip ties and run it on the component side of the board to this open hole just mentioned.
4. Change the orange wire to the opposite throw of the same pole.
5. Connect the blue wire to pin 1 of the PLL chip and the orange wire to the red dot terminal on the epoxy pack.

CONNECT UP THE CHANNEL 9 SWITCH:

1. Unsolder R-58, turn it around and leave the leg unsoldered and lifted.
2. Connect the brown and black wires across these two points.

(OPTIONAL)*

3. Solder the VC (supplied) across the two terminals of the other pole of the switch across from the black and brown wires. Also attach wires to these same terminals.
4. Cut the PC trace between the 10.24 Xtal and C-111. Solder these two wires acrosss the cut.

* If full channels are desired, steps 3 & 4 must be accomplished. If half channels are desired (which allows for splitting the transmitter and receiver) omit steps 3 & 4.

Now your CB/ANL/PA switch is your receiver switch and your channel 9 switch is your transmitter switch.

LOW CHANNELS FOR COBRA 21LTD AND SISTER UNITS CONTINUED:

5. Run a wire from the yellow dot terminal on the epoxy pack to the leg of C-12 nearest R-101.
6. Run a ground wire from the shield case of L-5 to the shield case of the upper tuning tank of the epoxy pack.

ALIGNMENT TX:

1. Connect power to the unit and load properly with a frequency counter attached.
2. Select channel 26.
3. With both switches up in normal position, key the transmitter, the reading should be 27.265 Mhz. If not, adjust VC-1 to obtain this reading.
4. Now switch the transmitter switch down, key the transmitter again. Now the reading should be 26.8100, or, if you have the option installed, 26.815 Mhz. If you have installed the option and you have not obtained the proper reading adjust the installed VC to obtain it.

ALIGNMENT RX:

1. Connect a scope or freq. meter to the leg of R-6 (a scope is preferred).
2. On receive mode and receiver switch down, this reading should be 37.505 Mhz, or if you have the option 37.5117 Mhz. (The epoxy pack comes preset for the latter.)
3. To obtain the proper frequency adjust the VC on the epoxy pack. Use L-19 to maximize the amplitude of this signal.

The tanks on the epoxy pack should require very little or no adjustment. If the 37 Mhz signal can not be obtained in the approximate same amplitude as the 16 Mhz. Check your work to see that all connections were made properly.

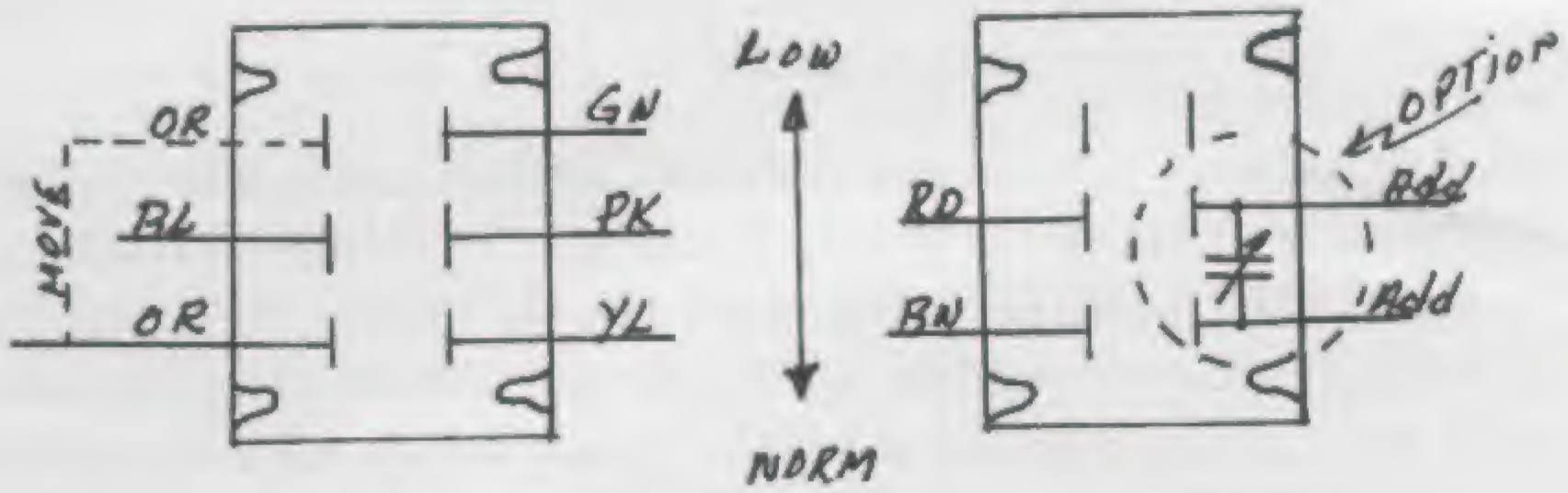
NOTE: When making alignments with a small signal applied, you will detect a zero beat. The zero beat you hear comes from the fact that two enternal frequencies, the VCO and 10.24Mhz, combine within the unit making up the total frequencies you are trying to receive.

4. Make your normal receiver alignment and peaking on normal channels. Make sure that VR-2 is adjusted to zero needle with no signal applied.
5. Now switch to low channels and check receiver sensitivity. If you have a needle on the meter even when no signal is applied or on adjacent channels, reduce the amplitude of the 37Mhz signal by inserting a resistor at the output leg of L-19, (generally less than 500 ohms.)

THIS COMPLETES INSTRUCTIONS FOR LOW CHANNELS FOR COBRA 21LTD AND SISTER UNITS.

"LTD KIT" LOW CHANNEL INSTALLATION INSTRUCTIONS FOR COBRA 25LTD/GTL, AR/AX 711, AND SISTER UNITS

The following switch lay-out is for the color code on the Cobra 25LTD. For other sister units or earlier models, note in pencil the color code that exist on those switches and adapt the reading material accordingly.



USE THE CB/ANL/PA and THE NB SWITCHES FOR THIS MOD:

1. Clip the pink, also the orange wire coming from the transmitter section just forward of the first zip tie, just forward of the power plug.
2. In this same area, unsolder the yellow and green wires.
3. Use the short piece of pink wire and solder it where you unsoldered the yellow wire.
4. Just forward of the audio transformer and directly center from the audio chip, unsolder the blue wire. Solder in it's place the piece of orange wire that runs from the transmitter section.
5. To clear the NB switch, clip the red wire attached at W-27 about 1½ inches long. Unsolder the brown wire at W-26 and solder the 1½ inch wire in its place.

INSTALLING THE EPOXY PACK:

1. Pull the chassis grounding tab, located just above the PLL chip, straight out.
2. Stand the wire tape up against the selector.
3. Using silicone sealant, adhere the epoxy pack to the chassis wall just forward of the pulled out tab, with the VC upward.

REMOVE THE FOLLOWING COMPONENTS:

REMOVE: R-104, R-105, R-106, C-137, TR-21, TR-22, C-12, C-15, D-3

REMOVE: L-19 and replace with the tank supplied.

1. Solder a 220 ohm resistor from the leg of R-105 to the C-137 leg nearest L-19.

LOW CHANNELS FOR COBRA 25LTD AND SISTER UNITS CONTINUED:

2. Solder a jumper from ground to the rear leg of the secondary of L-19.
3. On the PC side of the board, solder a 470 ohm resistor to the remaining secondary leg of L-19 with its other leg run through and soldered where the body of R-104 was. Now pull the green wire of the CB/ANL/PA switch out of its first two ties and solder it to the end of this resistor on the component side of the board, or through another hole in that same PC pad.

CONNECT UP THE REST OF THE CB/ANL/PA SWITCH:

1. Pull the yellow wire out of the zip ties. Measure the distance needed to reach the blue terminal on the epoxy pack. Cut the insulation and pull a bare spot. Now solder it to the hook/blue dot terminal on the epoxy pack.
2. Continue the yellow wire underneath the board (printed side) to the output secondary leg of L-16. Cut this same PC run just before the empty hole on the run.
3. Pull the pink wire out of the zip ties and run it on the component side of the board to this open hole just mentioned.
4. Change the orange wire to the opposite throw of the same pole.
5. Connect the blue wire to pin 1 of the PLL chip and the orange wire to the red dot terminal on the epoxy pack.

NOW CONNECT UP THE NB SWITCH:

1. Unsolder R-58, turn it around and leave the leg unsoldered and lifted.
2. Connect the brown and red wires to this resistor and the PC where it would be connected.

(OPTIONAL)*

3. Solder the VC (supplied) across the two terminals of the other pole of the switch, across from the red and brown wires. Also attach wires to these terminals.
4. Cut the PC trace between the 10.24 Xtal and C-111. Solder these two wires across the cut.

* If full channels are desired, steps 3 & 4 must be accomplished. If half channels are desired (which allows for splitting the transmitter and receiver) omit steps 3 & 4.

Now your CB/ANL/PA switch is your receiver switch and your NB switch is your transmitter switch.

LOW CHANNELS FOR COBRA 25LTD AND SISTER UNITS CONTINUED:

5. Run a wire from the yellow dot terminal on the epoxy pack to the leg of C-12 nearest R-101.
6. Run a ground wire from the shield case of L-5 to the shield case of the upper tuning tank of the epoxy pack.

ALIGNMENT TX:

1. Connect power to the unit and load properly with a freq counter attached.
2. Select channel 26.
3. With both switches in normal position, key the transmitter, the reading should be 27.265 Mhz. If not, adjust VC-1 to obtain this reading.
4. Now switch the transmitter switch down, key the transmitter again. Now the reading should be 26.8100 or if you have the option installed 26.815 Mhz. If you have installed the option and you have not obtained the proper reading, adjust the installed VC to obtain it.

ALIGNMENT RX:

1. Connect a scope or freq. meter to the leg of R-6. A scope is preferred.
2. On receive mode and the receiver switch down, this reading should be 37.505 Mhz or, if you have the option 37.5117 Mhz. The epoxy pack comes preset for the latter.
3. To obtain the proper frequency adjust the VC on the epoxy pack. Use L-19 to maximize the amplitude of this signal. The tanks on the epoxy pack should require very little or no adjustment. If the 37Mhz signal can not be obtained in the approximate same amplitude as the 16Mhz, check your work to see that all connections were made properly.

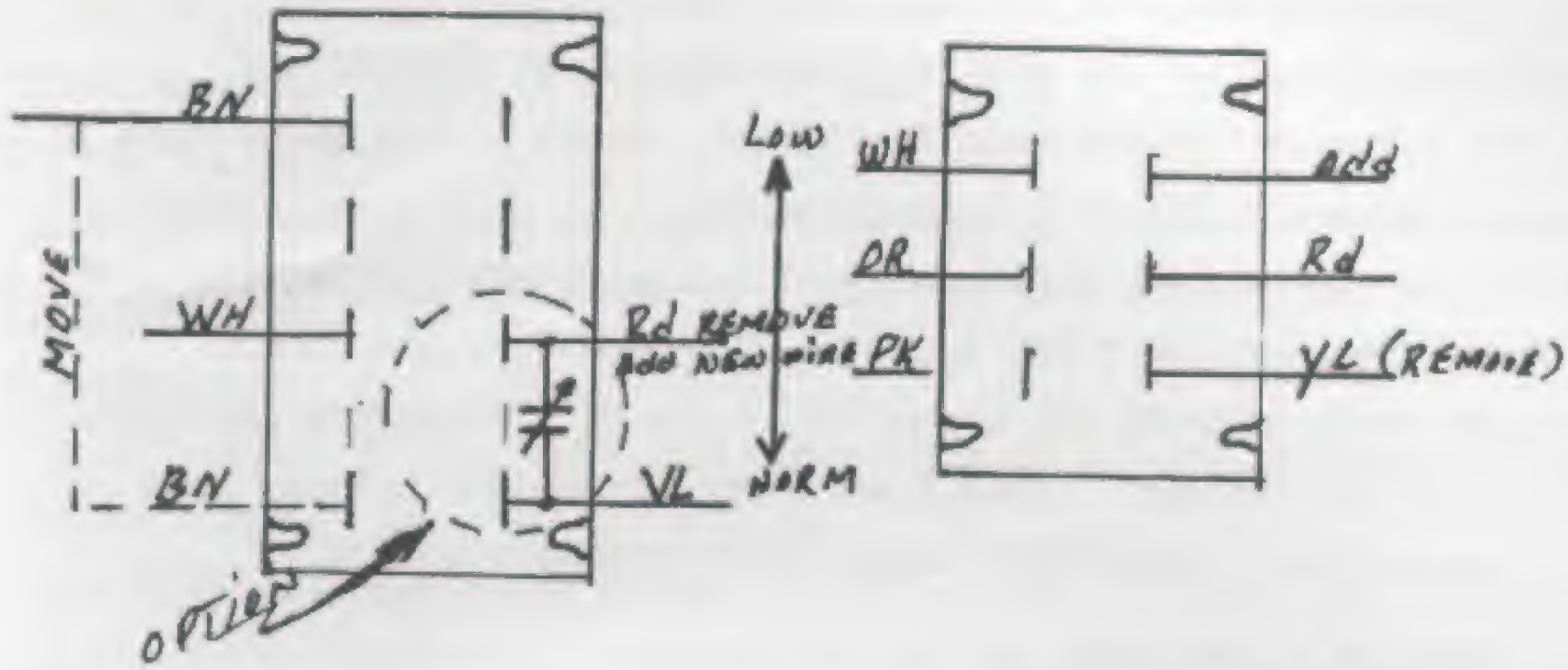
NOTE: When making alignments with a small signal applied, you will detect a zero beat signal. The zero beat you hear comes from the fact that two other signals exist enternally, who's sum is equal to the frequency you are trying to receive. (VCO and 10.24)

4. Make your normal receiver alignment and peaking on normal channels.
5. Now switch to low channels and check receiver sensitivity. If you have a needle on the meter even when no signal is applied or on adjacent channel, reduce the amplitude of the 37Mhz signal by inserting a resistor at the output leg of L-19, (generally less than 500 ohms.)

THIS COMPLETES INSTRUCTIONS FOR LOW CHANNELS FOR COBRA 25LTD AND SISTER UNITS.

"LTD KIT" LOW CHANNEL INSTALLATION INSTRUCTIONS FOR COBRA 29LTD/GTL AND SISTER UNITS

The following switch lay-out is for the color code on the Cobra 29LTD. For other sister units or earlier models, note in pencil the color code that exist on those switches and adapt the reading material accordingly.



CLEAR THESE TWO SWITCHES BY:

1. Clipping the white and pink wires just forward of the first zip tie forward of the power plug.
2. Unsolder the orange wire at PC board, and solder the short pink wire in it's place.
3. Unsolder the red wire of the PA/CB switch from the PC board (just forward of VR-1) and unsolder the yellow wire from the switch and solder in it's place.
4. Remove all wires attached to the ANL/NB switch except the red one at the PC board. Remove the red one at the switch.
5. Move the brown wire of the ANL/NB switch to the other throw terminal.

INSTALL THE EPOXY PACK:

1. Pull the chassis grounding tab, located just above the PLL chip, straight out.
2. Mount the epoxy pack against that chassis wall just forward of the pulled out tab, with the variable cap. up. If CC-1 will not allow the epoxy pack to slide down far enough, chip out a "V" just to the rear of the lower tank on the epoxy pack using small dikes.
3. Using silicone sealant, adhere the epoxy pack to the wall.

LOW CHANNELS FOR COBRA 29LTD AND SISTER UNITS CONTINUED:

REMOVE OR UNSOLDER THE FOLLOWING COMPONENTS:

REMOVE JP-22, C-1, D-24

REMOVE AND SAVE THESE COMPONENTS TO MODIFY 21LTD, PC-66, AX-44, ETC.;
R-3, TR-2, R-6, C-7, R-5.

REMOVE C-3 and resolder where R-3 leg and TR-2 base was.

REMOVE L-1 and replace with new tank provided.

R-2 - Unsolder the body end and resolder where D-24 cathode was.

1. Solder the red wire removed from the ANL/NB switch to the spare hole in the PC pad where the leg of R-2 is attached.
2. Cut this same pad between the point just soldered and the secondary of L-1.
3. Run a jumper between the other leg of L-1's secondary and ground.
4. Connect the white wire on the CB/PA switch to this secondary leg just isolated from the PC pad. (Note the center leg of the primary does not have to be isolated since there is no connection enternally.)

CONNECT UP THE REST OF THE CB/PA switch:

1. Pull the pink wire out of the zip ties. Measure the distance needed to reach the blue terminal on the epoxy pack. Cut the insulation and pull a bare spot. Now solder it to the hook terminal-blue dot of the epoxy pack.
2. Continue the pink wire to the point where JP-22 was removed near L-18 and solder.
3. Pull the orange wire out of the zip ties and run it along the left side of the receiver section to the other point where JP-22 was removed.
4. Connect the red wire to the leg of R-124, just off of pin 11 of the PLL chip component side of board.
5. Connect a new wire to the same pole opposit position from where the yellow wire was removed.
6. Connect this wire to the red dot terminal of the epoxy pack.
7. Run a jumper wire from the yellow dot terminal on the epoxy pack to where C-1 was removed from the long PC run.
8. Run a grounding wire from the case of L-22 to the top tank of the epoxy pk.

CONNECT UP THE ANL/NB SWITCH:

1. Move the brown wire to the other throw position of the same pole.
2. Unsolder and lift the cathode side of D-15.
3. Connect the brown and white wire of this switch pole across these points.

LOW CHANNELS FOR COBRA 29LTD AND SISTER UNITS CONTINUED:

(OPTIONAL):*

4. Solder the VC (supplied) across the violet and red wires at the switch terminals of this switch.
5. Cut the PC trace between the 10.24 Xtal and the input leg of L-24.
6. Solder the violet and red wires across this cut.

* If full channels are desired, steps 4, 5 & 6 must be accomplished. If half channels are desired (which allows for splitting the transmitter and receiver) omit steps 4, 5, & 6.

Now your CB/PA switch is your Receiver switch and the ANL/NB switch is your Transmitter switch. With up being normal and down being low.

ALIGNMENT TX:

1. Connect power to unit and load properly with a freq. counter attached.
2. Select channel 26.
3. With both switches up to normal position, key transmitter. The reading should be 27.265Mhz. If not adjust L-24 to obtain this reading.
4. Now switch the transmitter switch down.
5. Key the transmitter again. Now the reading should be 26.8100, or if you have installed the VC (option 5K offst) should read 26.815Mhz. If you have the option and it does not read proper adjust the VC to obtain it.

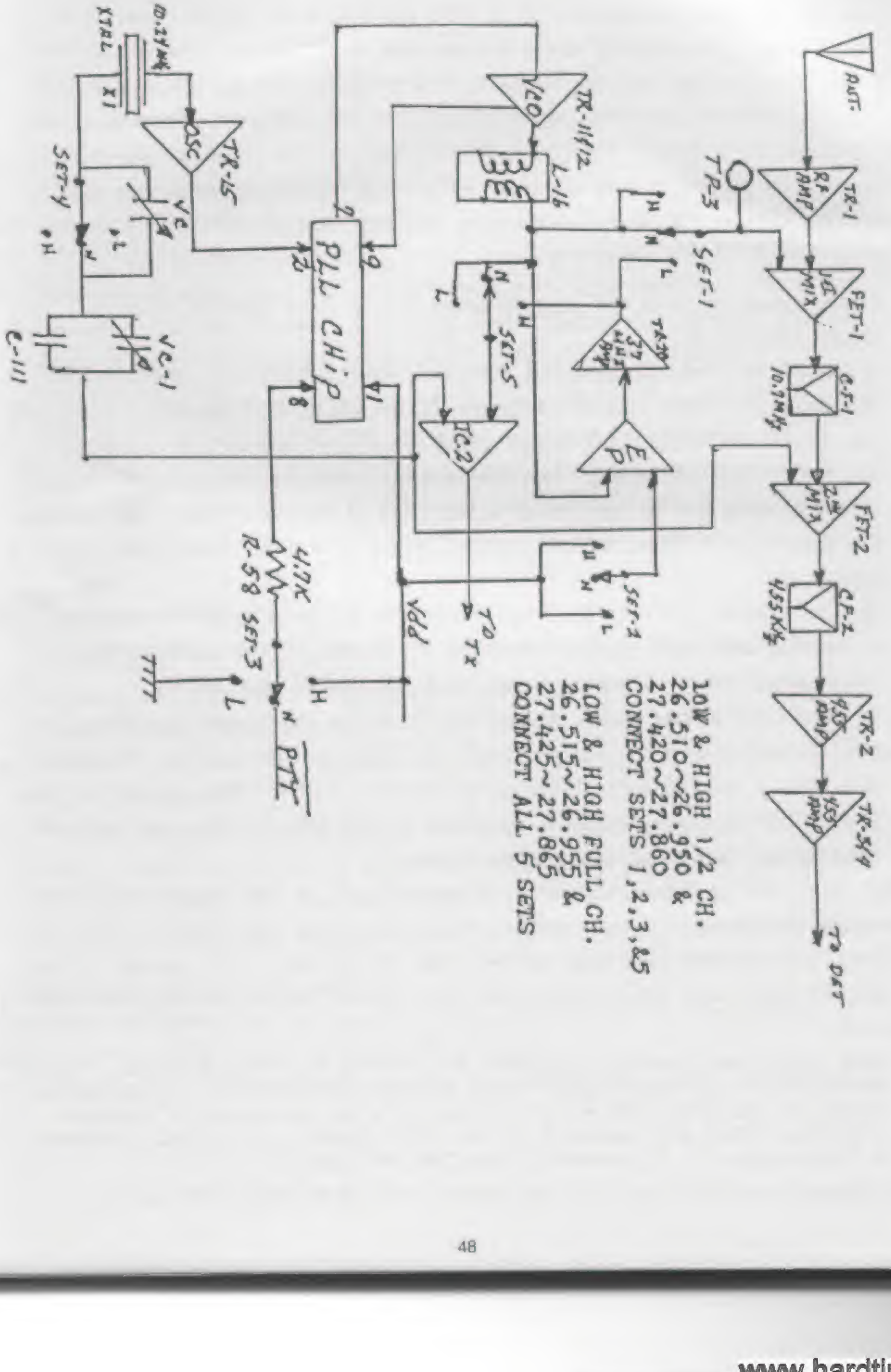
ALIGNMENT RX:

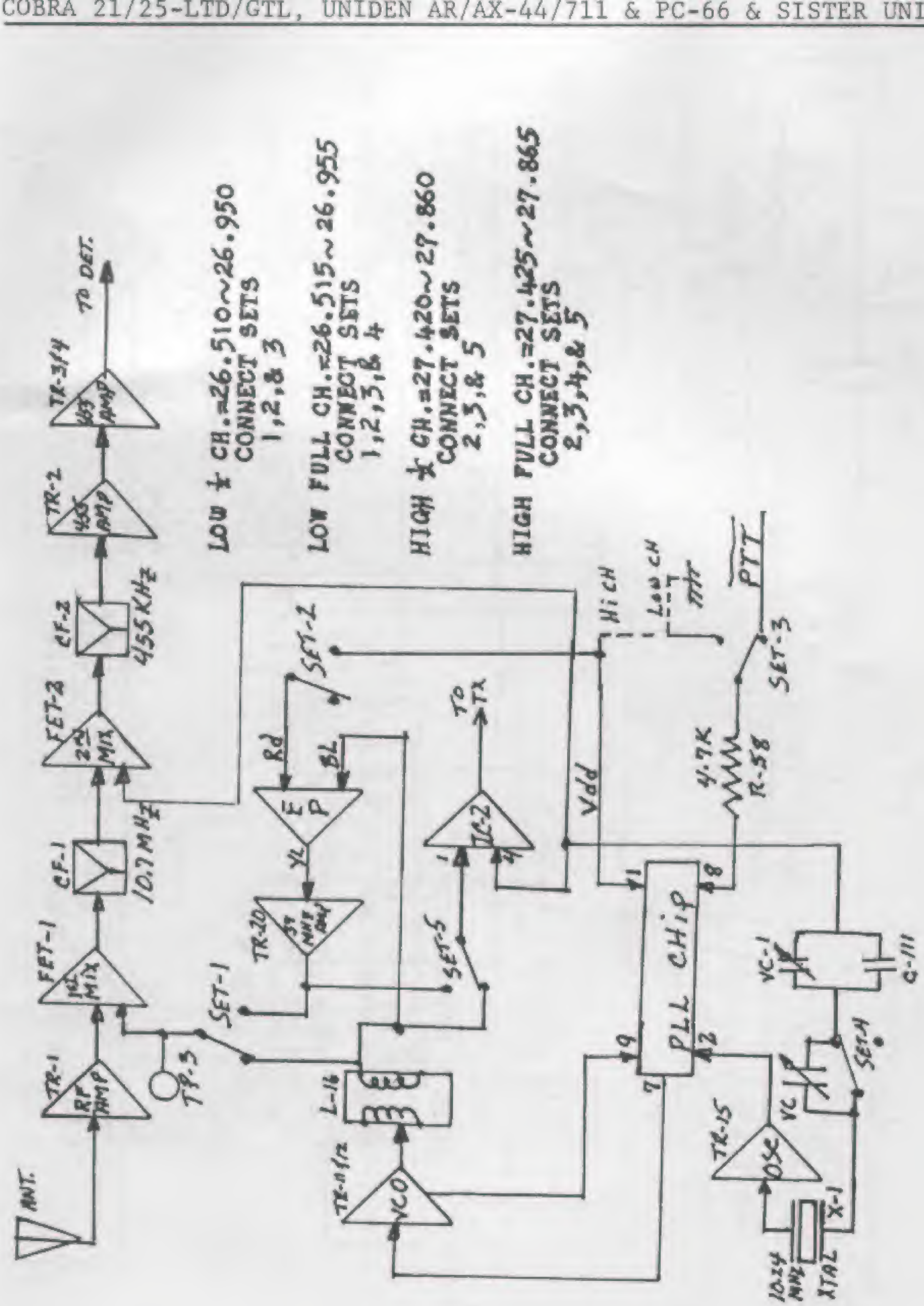
1. Connect a scope or freq. meter to the leg of R-17. A scope is preferred.
2. On receive mode this reading should be 37.505Mhz. Or if you have the option 37.5117Mhz. The epoxy pack comes preset for the latter.
3. To obtain the proper freq., adjust the VC on the epoxy pack to obtain it. Use L-1 to maximize the amplitude of this signal. The tanks on the epoxy pack should require very little or no tuning. If the 37Mhz signal can not be obtained in the approximate amplitude as the 16Mhz, check your work to see that all connections were made properly.

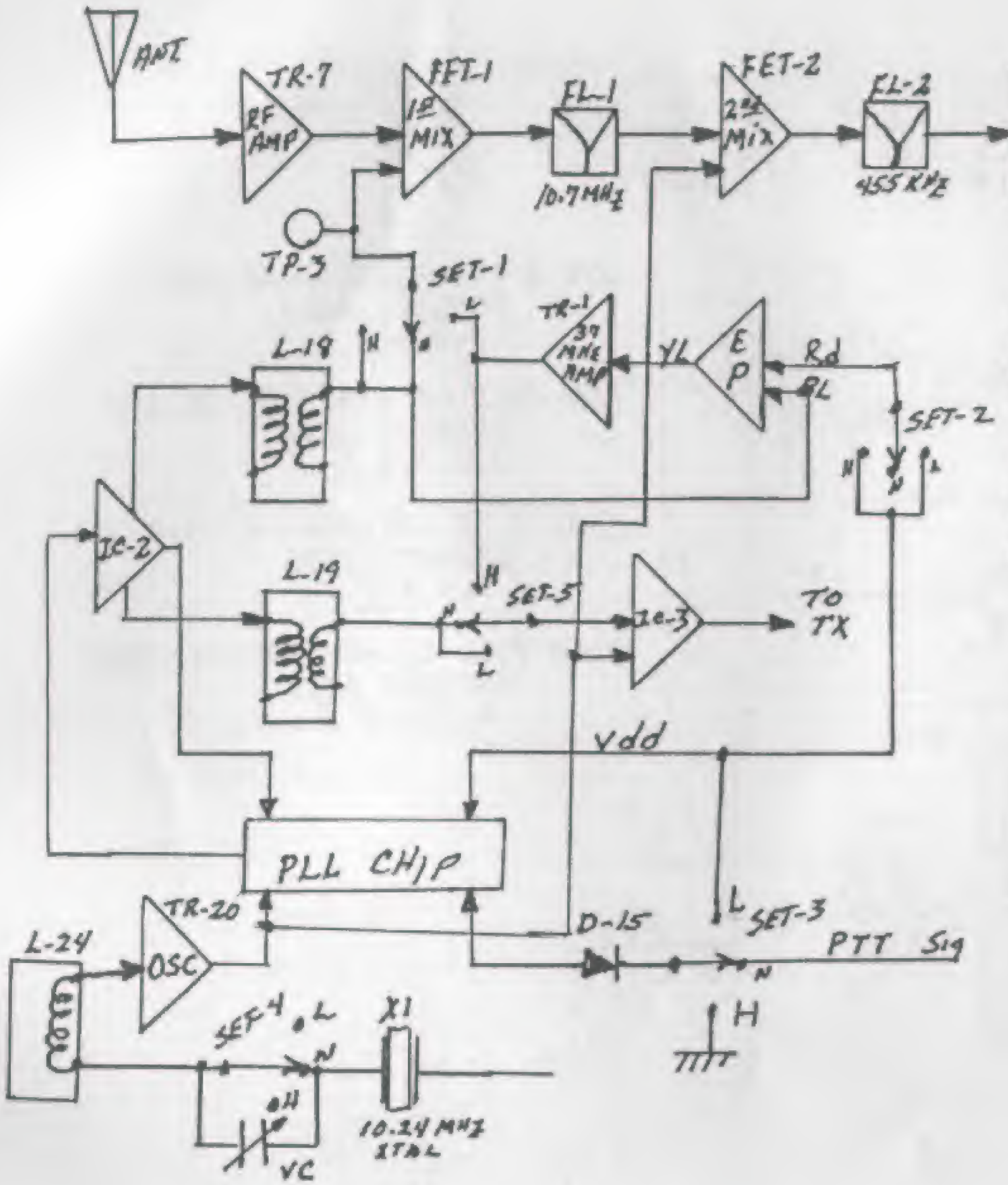
NOTE: When making these receiver alignments the DELTA TUNE should be in it's mid detent position. The zero beat you will hear comes from the fact that the VCO freq. and 10.24Mhz does make up the total of the same freq. you are trying to receive, which will have a great deal with how and where the previous wires were run.

4. Make your normal receiver alignment and peaking on normal channels.
5. Now switch to low channels and check receiver sensitivity. If you have a needle on the meter even when no signal is being applied or on adjacent channels, reduce the amplitude of the 37Mhz signal by inserting a resistor at the out-put of L-1 (generally less than 500 ohms.).

THIS COMPLETES INSTRUCTIONS FOR LOW CHANNELS FOR 29LTD AND SISTER UNITS.

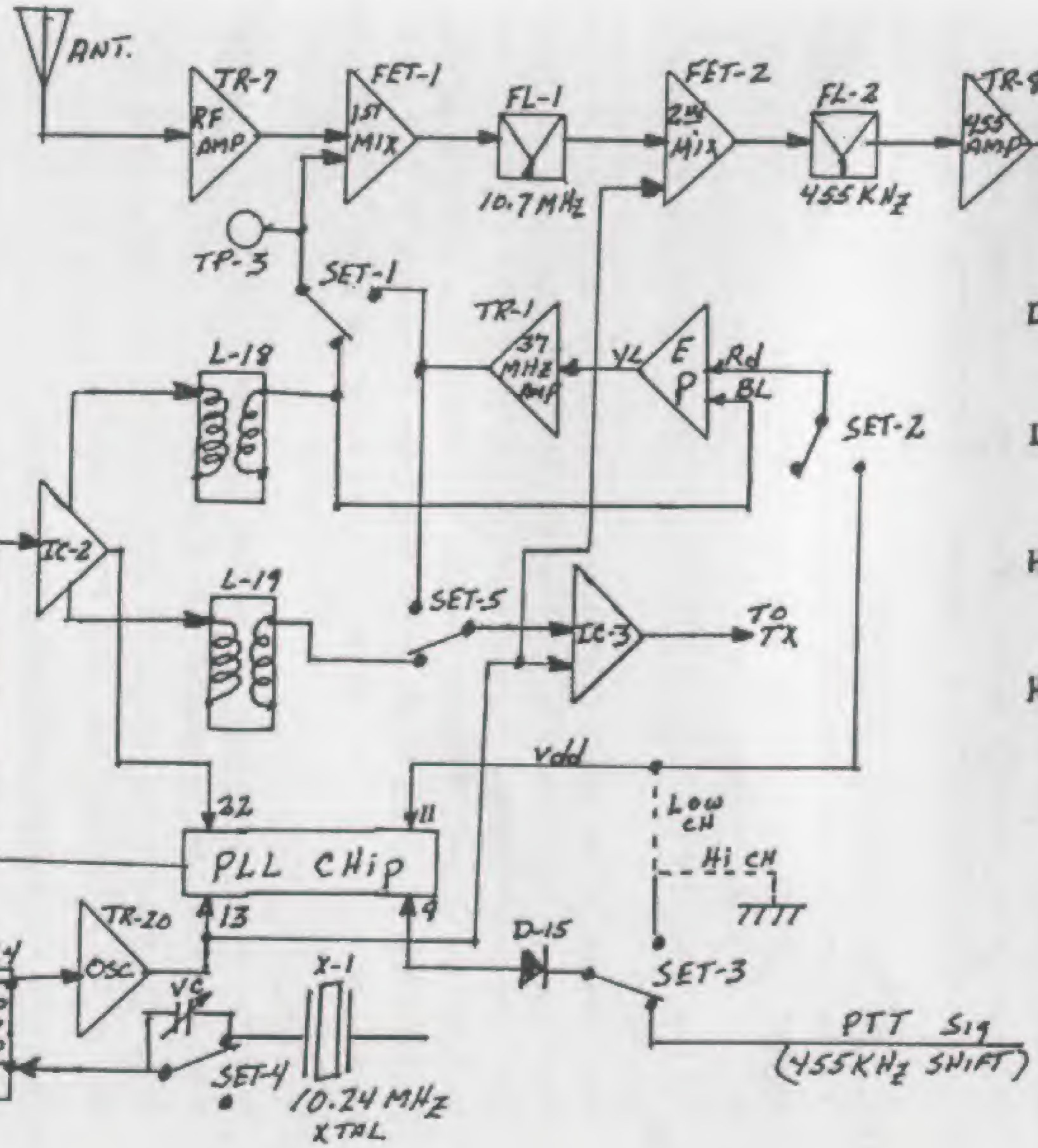






LOW & HIGH 1/2CH.
26.510~26.950 &
27.420~27.860
CONNECT SETS 1,2,3,&5

LOW & HIGH FULL CH.
26.515~26.955 &
27.425~27.865
CONNECT ALL 5 SETS



LOW ± CH.=26.510~26.950
CONNECT SEIS
1,2, & 3

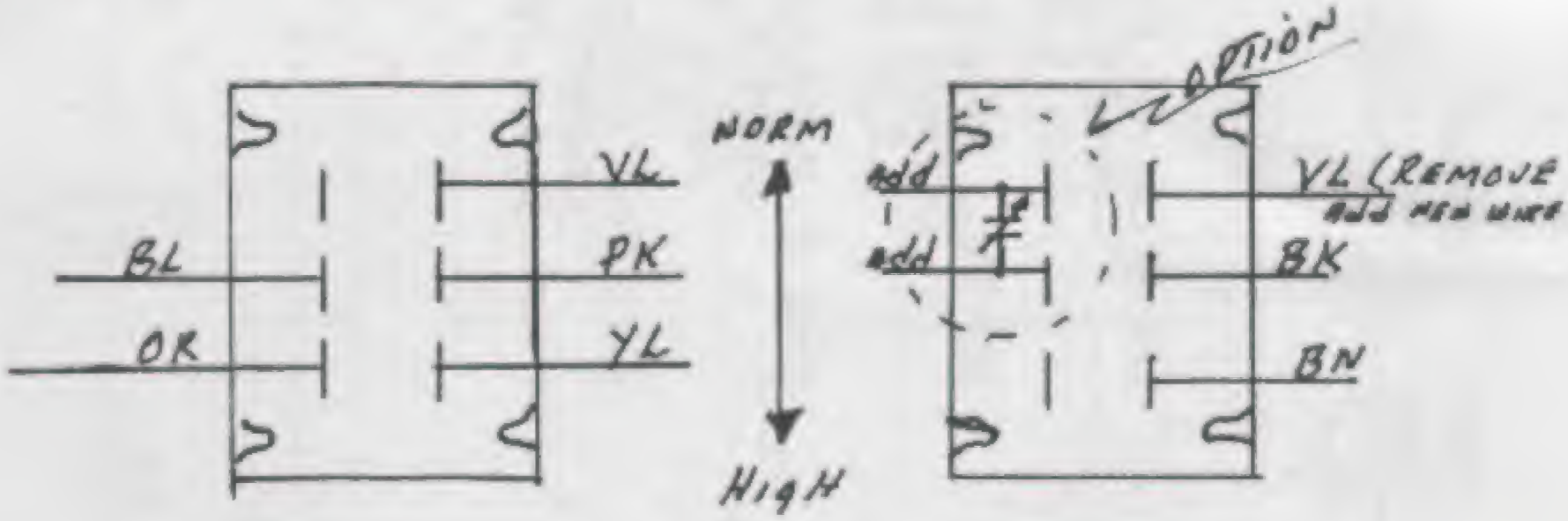
LOW FULL CH.=26.515~26.955
CONNECT SETS
1,2,3, & 4

HIGH ± CH=27.420~27.860
CONNECT SETS
2,3 & 5

HIGH FULL CH=27.425~27.865
CONNECT SETS
2,3,4, & 5

"LTD KIT" UPPER CHANNEL INSTALLATION INSTRUCTIONS FOR COBRA 21LTD/GTL, ANDREW J, AR/AX-44, PC-66, AND ANY SISTER UNITS

The following switch layout is for the color code on the Cobra 21LTD. For other sister units or earlier models, note in pencil the color code that exist on those switches and adapt the reading material accordingly.



USING THE TWO EXISTING SWITCHES:

1. Clip the yellow wire, also the orange wire coming from the transmitter section, just forward of the first Zip tie forward of the power plug.
2. In this same area unsolder the pink and violet wires.
3. Use the short piece of yellow wire and solder it where you unsoldered the pink wire.
4. Just forward of the audio transformer and directly center from the audio chip unsolder the blue wire. Solder in it's place the piece of orange wire that runs from the transmitter section.
5. To clear the channel 9 switch, remove the violet wire from the switch.
6. Unsolder the brown and black wires from their respective PC boards.
7. Solder the violet wire on to the PC board where the black wire was removed.

INSTALLING THE EPOXY PACK:

1. Pull the chassis grounding tab located just above the PLL chip straight out.
2. Stand the wire tape up against the selector.
3. Using silicone sealant adhere the epoxy pack to the chassis wall just forward of the pulled out tab, with the VC upward.

INSTALL THE FOLLOWING MISSING COMPONENTS:

R-101 - 10K	C-136 - .01uf
R-102 - 3.3K	TR-20 - Use a 2SC1675 or a 2SC1923
R-103 - 1K	L-19 - Install (supplied)

UPPER CHANNELS FOR COBRA 21LTD AND SISTER UNITS CONTINUED:

1. Solder a 220ohm resister from the leg of R-105 to C-137 leg nearest L-19.
2. Solder in a jumper wire from W-26 to W-27.
3. Solder a jumper from ground to the rear leg of the secondary of L-19.
4. On the PC side of the board, solder a 470ohm resistor to the remaining secondary leg of L-19 with its other leg run through and soldered where the body of R-104 should be. Now pull the yellow wire of the CB/ANL/PA switch out of two ties and solder it to this end of the resistor on the component side of the PC board, or through another hole in that same PC pad.

CONNECTING UP THE REST OF THE CB/ANL/PA SWITCH:

1. Remove JP-14.
2. Pull the violet wire out of the zip ties. Measure the distance needed to reach the blue dot terminal on the epoxy pack. Cut the insulation and pull a bare spot. Now solder it to the blue hook terminal on the epoxy pack.
3. Continue with the violet wire and solder it to the point where JP-14 was connected to L-16.
4. Pull the pink wire out of the zip ties and solder it to the other point JP-14 was connected.
5. Pull the orange wire out of the zip ties and solder it to the red dot terminal on the epoxy pack.
6. Pull the blue wire out of the zip ties and solder it to pin 1 of the PLL chip on the PC side of the board.

CONNECTING UP THE CHANNEL 9 SWITCH:

1. Unsolder R-58, turn it around and leave the leg unsoldered and lifted.
2. Connect a wire to the unused terminal on the same pole where the brown and black wires are. Solder the other end of it to the other point where R-58 was soldered.
3. Pull the black wire out of the zip ties and solder it to the raised leg of R-58.
4. Pull the brown wire out of the zip ties and solder it to pin 1 of the PLL chip, PC side.

NOTE: IF YOU WISH TO HAVE HALF CHANNELS INSTEAD OF FULL CHANNELS, OMIT STEPS 5 & 6 BELOW.*

5.* Solder the VC (supplies) across the two terminals opposite the new wire and the black wire, also attach wires to these terminals.

6.* Cut the PC trace between the 10.24Mhz Xtal and C-11. Solder these two wires across the cut.

UPPER CHANNELS FOR COBRA 21LTD AND SISTER UNITS CONTINUED:

7. Run a wire from the yellow dot terminal of the epoxy pack to the leg of C-12 nearest R-101.
8. Run a ground wire from the shield (case) of L-15 to the shield (case) of the upper tuning tank on the epoxy pack.

ALIGNMENT TX:

1. Connect power to the unit and load properly with a freq. counter attached.
2. Select channel 26.
3. With both switches in normal position (down), key the transmitter. The reading should be 27.265Mhz. If not, adjust VC-1 to obtain this reading. If you find you must back off too far on VC-1 to obtain this reading, remove C-111 and readjust.
4. Now switch both switches up. Read the frequency of the 10.24Mhz Xtal at the forward end of R-69. Adjust the VC on the NB switch to obtain a frequency of 10.2417Mhz.
5. Using a scope, maximize the signal on the center terminal (pink wire) of the CB/ANL/PA switch by tuning L-19. The tanks on the epoxy pack sould require very little or no adjustment.
6. Now key the transmitter again. The reading should be 27.725Mhz. If not adjust the VC on the epoxy pack to obtain it.

NOTE: For those wishing half channels, of course, the 10.24 Xtal would remain just that and the reading in step 6 should be adjusted to read 27.720MHz.

ALIGNMENT RX:

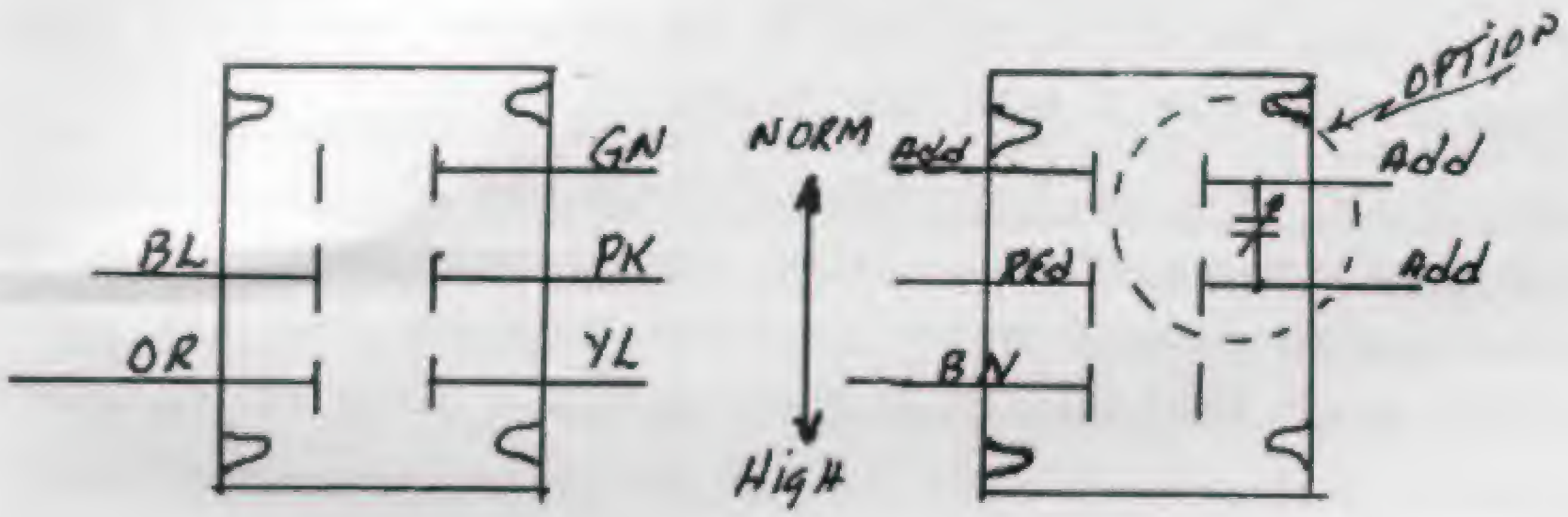
1. Check the receiver and make your normal alignments and peaking on normal channels, (both switches down.)
2. Now check your receiver with both switches up, while applying a 27.725Mhz signal. The sensitivity should be approximately the same. If not. a little balancing of L-1 and L-2 should accomplish this.

The zero beat signal you will hear while applying a small signal comes from the fact that two of the signals in use are equal to the frequency you are receiving.

THIS COMPLETES THE INSTALLATION INSTRUCTIONS FOR COBRA 21LTD AND SISTER UNITS.

"LTD KIT" UPPER CHANNEL INSTALLATION INSTRUCTIONS FOR COBRA 25LTD/GTL, AR/AX 711, AND SISTER UNITS

The following switch lay-out is for the color code on the COBRA 25LTD. For other sister units or earlier models, note in pencil the color code that exist on those switches and adapt the reading material accordingly.



USE THE CB/ANL/PA AND THE NB SWITCHES FOR THIS MOD:

1. Clip the yellow, also the orange wire coming from the transmitter section, just forward of the first zip tie, just forward of the power plug.
2. In this same area, unsolder the pink and green wires.
3. Use the short piece of yellow wire and solder it where you unsoldered the pink wire.
4. Just forward of the audio transformer and directly center from the audio chip, unsolder the blue wire. Solder in it's place the piece of orange wire that runs from the transmitter section.
5. To clear the NB switch, clip the red wire attached at W-27 about 1½ inches long. Unsolder the brown wire at W-26 and solder the 1½ inch wire in it's place

INSTALLING THE EPOXY PACK:

1. Pull the chassis grounding tab, located just above the PLL chip, straight out.
2. Stand the wire tape up against the selector.
3. Using silicone sealant, adhere the epoxy pack to the chassis wall just forward of the pulled out tab, with the VC upward.

REMOVE THE FOLLOWING COMPONENTS:

REMOVE: R-105, R-106, C-137, TR-21, TR-22, C-12, R-104, C-15 D-3. Remove L-19 and replace with the tank supplied.

UPPER CHANNELS FOR COBRA 25LTD AND SISTER UNITS CONTINUED:

1. Solder a 220 ohm resistor from the leg of R-105 to the C-137 leg nearest L-19.
2. Solder a jumper from ground to the rear leg of the secondary of L-19.
3. On the PC side of the board, solder a 470 ohm resistor to the remaining secondary leg of L-19 with it's other leg run through and soldered where the body of R-104 was. Now pull the yellow wire out of the zip ties and solder it to this end of the resistor on the component side of the board, or through another hole in that same PC pad.

CONNECTING UP THE REST OF THE CB/ANL/PA SWITCH:

1. Pull the green wire out of the zip ties. Measure the distance needed to reach the blue dot terminal on the epoxy pack. Cut the insulation and pull a bare spot. Now solder it to the blue hook terminal on the epoxy pack.
2. Remove JP-14, now continue with the green wire and solder it to the point where JP-14 was connected to L-16.
3. Pull the pink wire out of the zip ties and solder it to the other point JP-14 was connected.
4. Pull the orange wire out of the zip ties and solder it to the red dot terminal on the epoxy pack.
5. Pull the blue wire out of the zip ties and solder it to pin 1 of the PLL chip on the PC side of board.

NOW CONNECT UP THE NB SWITCH:

1. Unsolder R-58, turn it around and leave the leg unsoldered and lifted.
2. Connect a wire to the unused terminal on the same pole where the brown and red wires are. Solder the other end of it to the other point R-58 was soldered.
3. Pull the red wire out of the zip ties and solder it to the raised leg of R-58.
4. Pull the brown wire out of the zip ties and solder it to pin 1 of the PLL Chip on PC side.

NOTE: If you wish to have half channels instead of full channels omit steps 5 & 6 below.*

5.* Solder the VC (supplied) across the two terminals opposite the new wire and the red wire, also attach wires to these terminals.

6.* Cut the PC trace between the 10.24Mhz Xtal and C-111. Solder these two wires across the cut.

UPPER CHANNELS FOR COBRA 25LTD AND SISTER UNITS CONTINUED:

7. Run a wire from the yellow dot terminal of the epoxy pack to the leg of C-12 nearest R-101.
8. Run a ground wire from the shield (case) of L-5 to the shield (case) of the upper tuning tank of the epoxy pack.

ALIGNMENT TX:

1. Connect power to the unit and load properly with a freq. counter attached.
2. Select channel 26.
3. With both switches in normal position (down), key the transmitter. The reading should be 27.265Mhz. If not, adjust VC-1 to obtain this reading. If you find you must back off too far on VC-1 to obtain this reading, remove C-111 and re-adjust.
4. Now switch both switches up. Read the frequency of the 10.24Mhz Xtal at the forward end of R-69. Adjust the VC on the NB switch to obtain a frequency of 10.2417Mhz.
5. Using a scope, maximize the signal on the center terminal (pink wire) of the CB/ANL/PA switch, by tuning L-19. The tanks on the epoxy pack should require very little or no adjustment.
6. Now key the transmitter again. The reading should be 27.725Mhz. If not adjust the VC on the epoxy pack to obtain it.

NOTE: For those wishing half channels, of course, the 10.24 Xtal would remain just that and the reading in step 6 should be adjusted to read 27.720Mhz.

ALIGNMENT RX:

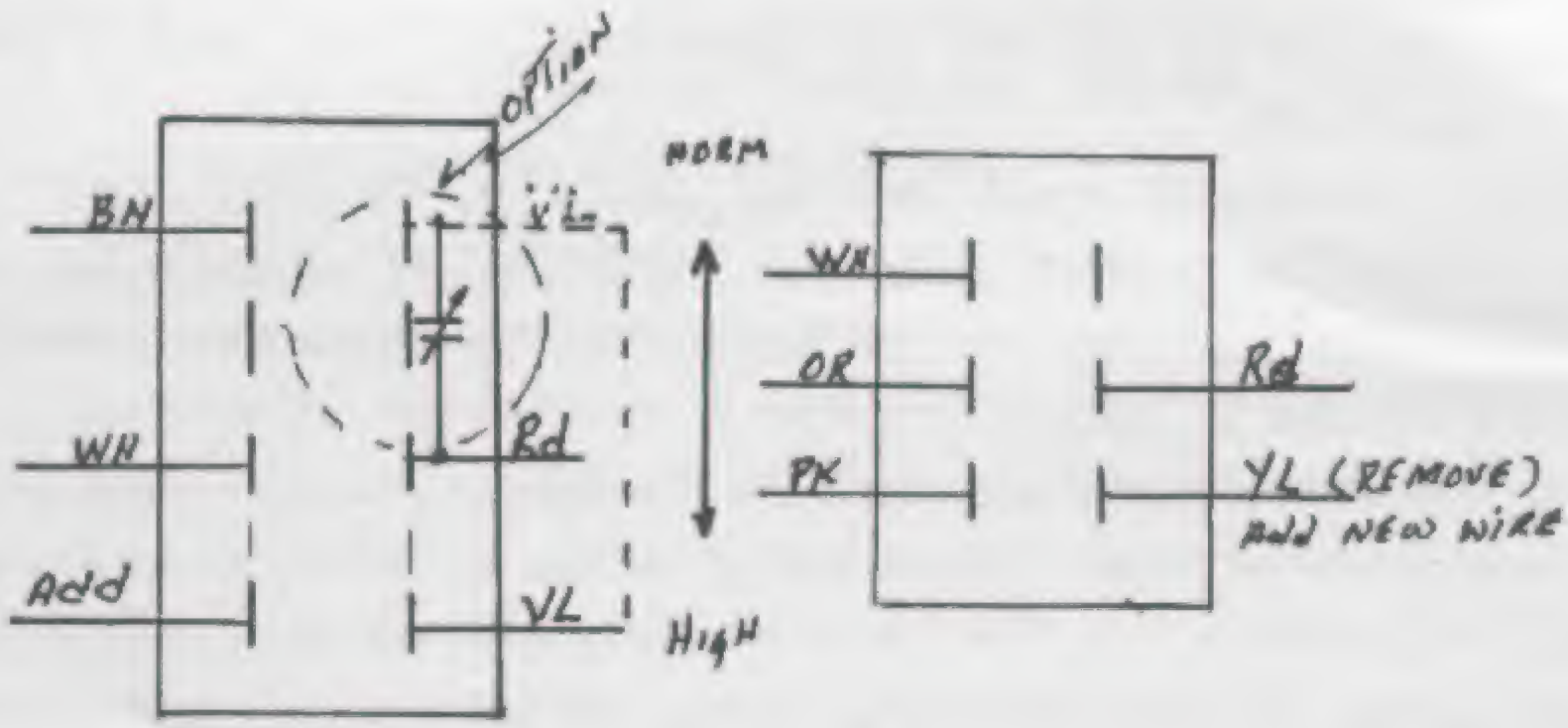
1. Check the receiver and make your normal alignments and peaking on normal channels. Both switches down.
2. Now check your receiver with both switches up, while applying a 27.725MHz signal. The sensitivity should be approximately the same. If not, a little balancing of L-1 and L-2 should accomplish this.

The zero beat signal you will hear while applying a small signal comes from the fact that two of the signals in use are equal to the frequency you are receiving.

THIS COMPLETES UPPER CHANNEL INSTRUCTIONS FOR COBRA 25LTD AND SISTER UNITS.

"LTD KIT" UPPER CHANNEL INSTALLATION INSTRUCTIONS FOR COBRA 29LTD/GTL AND SISTER UNITS

The following switch lay out is for the color code on the COBRA 29LTD. For other sister units or earlier models, note in pencil the color code that exist on those switches and adaot the reading material accordingly.



CLEAR THESE TWO SWITCHES BY:

1. Clipping the white and pink wires just forward of the first zip tie forward of the power plug.
2. Unsolder the orange wire at PC board, and solder the short pink wire in it's place.
3. Unsolder the red wire of the PA/CB switch from the PC board, just forward of VR-1, and unsolder the yellow wire from the switch and solder in it's place.
4. Remove all wires attached to the ANL/NB switch except the red one at the PC board. Remove the red one at the switch.
5. Move the brown wire of the ANL/NB switch to the other throw terminal.

INSTALL THE EPOXY PACK:

1. Pull the chassis grounding tab, located just above the PLL chip, straight out.
2. Mount the epoxy pack against that chassis wall just forward of the pulled out tab, with the variable capacitor up. If CC-1 will not allow the epoxy pack to slide down far enough chip out a "V" just to the rear of the lower tank on the epoxy pack using small dikes.
3. Using silicone sealant, adhere the epoxy pack to the wall.

UPPER CHANNELS FOR COBRA 29LTD AND SISTER UNITS CONTINUED:

REMOVE OR UNSOLDER THE FOLLOWING COMPONENTS:

REMOVE: JP-22, C-1, D-24

REMOVE: TR-2, R-6, C-7, R-5 and save these components to modify 21Ltd, PC-66, AX-44, ETC.

C-3 - Remove and resolder where R-3 leg & TR-2 base was.

L-1 - Remove and replace with new tank provided.

R-2 - Unsolder the body end and resolder where D-24 cathode was.

1. Solder the red wire removed from the ANL/NB switch to the spare hole in the PC pad where the leg of R-2 is attached.
2. Cut this same pad between the point just soldered and the secondary of L-1.
3. Run a jumper between the other leg of L-1's secondary and ground.
4. Connect the pink wire on the CB/PA switch to this secondary leg just isolated from the PC pad. NOTE: The center leg of the primary does not have to be isolated since there is no connection internally.

CONNECT UP THE REST OF THE CB/PA SWITCH:

1. Pull the white wire out of the zip ties. Measure the distance needed to reach the blue terminal on the epoxy pack. Cut the insulation and pull a bare spot. Now solder it to the hook terminal-blue dot of the epoxy pack.
2. Continue the white wire to the point where JP-22 was removed near L-18 and solder.
3. Pull the orange wire out of the zip ties and run it along the left side of the receiver section to the other point where JP-22 was removed.
4. Connect the red wire to the leg of R-124, just off of pin 11 of the PLL chip component side of board.
5. Connect a new wire to the same pole where the yellow wire was removed.
6. Connect this wire to the red dot terminal on the epoxy pack.
7. Run a jumper wire from the yellow dot terminal on the epoxy pack to where C-1 was removed from the long PC run.
8. Run a grounding wire from the case of L-22 to the top tank (case) of the epoxy pack.

CONNECT UP THE ANL/NB SWITCH:

1. Add a wire to the other throw position of the same pole where the white and brown wires are. Connect to pin 11 of PLL chip.
2. Unsolder and lift the cathode end of D-15.
3. Connect the brown wire where the cathode was lifted from.
4. Connect the white wire to the raised leg of D-15.

UPPER CHANNELS FOR COBRA 29LTD AND SISTER UNITS CONTINUED:

OPTION: If full channels are desired steps 5, 6, 7, & 8 must be accomplished. If half channels are desired omit them.

5. Move the violet wire to the opposite throw.
6. Solder the VC (supplied) across the violet and red wires.
7. Cut the PC trace between the 10.24Mhz Xtal and the input leg of L-24.
8. Solder the violet and red wires across this cut. Now your switches should be down for normal position and up for high channels.

ALIGNMENT TX:

1. Connect power to the unit and load properly with a frequency meter attached.
2. Select channel 26.
3. With both switches down to normal position, key the transmitter. The reading should be 27.265Mhz. If not adjust L-24 to obtain this reading.
4. Now switch both switches up.
5. With a scope and/or counter connected to TP-3, the reading during receive should be 17.025Mhz. Or with the option 27.0283Mhz. If you are using the option and the reading is incorrect, adjust the VC you installed to obtain the correct reading.
6. Now read the signal on the orange wire of the CB/PA switch.
7. Adjust L-1 to maximize this signal. The tanks on the epoxy pack should require very little or no tuning.
8. This 37Mhz signal should read 37.960Mhz or with the option 37.9667Mhz. If not, adjust the VC on the epoxy pack to obtain the desired reading.
9. As a final check of the transmitter, key the mike and read the output frequency. Should be 27.720Mhz or with option 27.725Mhz.

ALIGNMENT RX:

1. Very little tuning should be required. Make a normal alignment and peaking using channel 40.

THIS COMPLETES THE UPPER CHANNEL INSTRUCTIONS FOR COBRA 29 AND OTHER SISTER UNITS.

UPPER CHANNELS FOR COBRA 29LTD AND SISTER UNITS CONTINUED:

OPTION: If full channels are desired steps 5, 6, 7, & 8 must be accomplished. If half channels are desired omit them.

5. Move the violet wire to the opposite throw.
6. Solder the VC (supplied) across the violet and red wires.
7. Cut the PC trace between the 10.24Mhz Xtal and the input leg of L-24.
8. Solder the violet and red wires across this cut. Now your switches should be down for normal position and up for high channels.

ALIGNMENT TX:

1. Connect power to the unit and load properly with a frequency meter attached.
2. Select channel 26.
3. With both switches down to normal position, key the transmitter. The reading should be 27.265Mhz. If not adjust L-24 to obtain this reading.
4. Now switch both switches up.
5. With a scope and/or counter connected to TP-3, the reading during receive should be 17.025Mhz. Or with the option 27.0283Mhz. If you are using the option and the reading is incorrect, adjust the VC you installed to obtain the correct reading.
6. Now read the signal on the orange wire of the CB/PA switch.
7. Adjust L-1 to maximize this signal. The tanks on the epoxy pack should require very little or no tuning.
8. This 37Mhz signal should read 37.960Mhz or with the option 37.9667Mhz. If not, adjust the VC on the epoxy pack to obtain the desired reading.
9. As a final check of the transmitter, key the mike and read the output frequency. Should be 27.720Mhz or with option 27.725Mhz.

ALIGNMENT RX:

1. Very little tuning should be required. Make a normal alignment and peaking using channel 40.

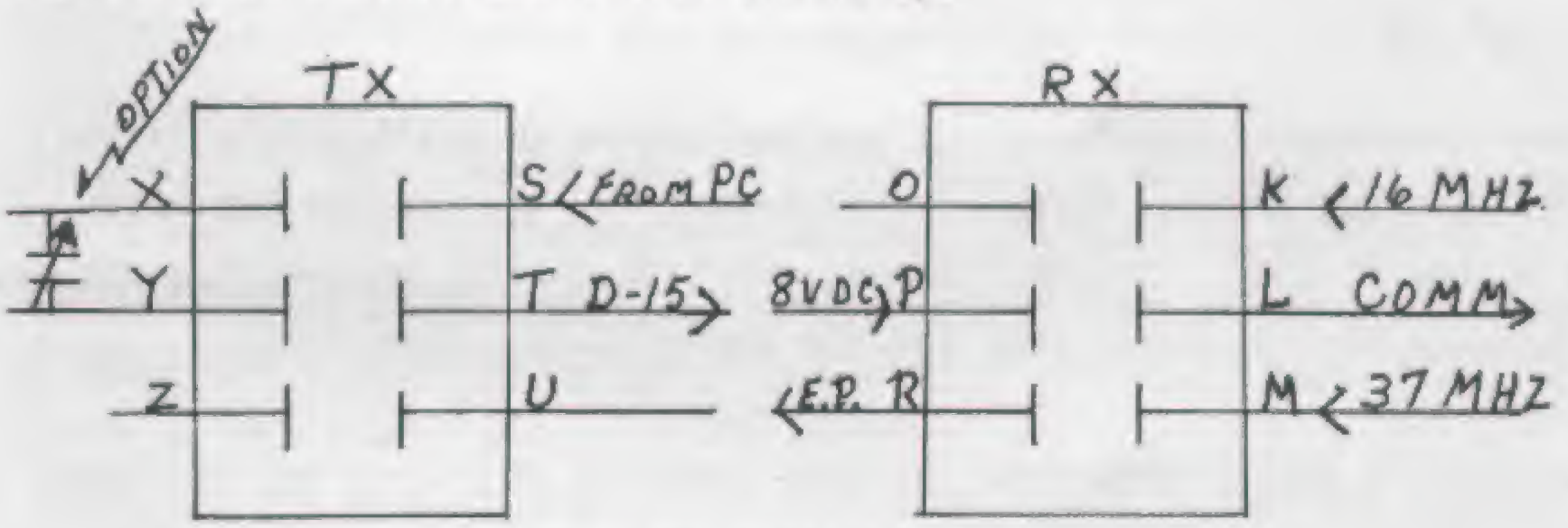
THIS COMPLETES THE UPPER CHANNEL INSTRUCTIONS FOR COBRA 29 AND OTHER SISTER UNITS.

"LTD KIT" LOW CHANNEL INSTALLATION INSTRUCTIONS FOR COBRA 21/25 PLUS UNITS AND ANY SISTER UNITS

It is not feasible to use the existing switches on these units. We suggest that for any and all single modifications, that you use two DPDT sub-miniature switches. Also, since we will be using 8VDC Regulated (maximum allowable voltage) on the Epoxy Pack, we feel that the final 37Mhz. amplifier can be eliminated. True, you will not have quite as clear of a signal but since the circuits are all on the same plane, you are less likely to pick up stray signals or have as much mutual inductuance.

MOUNTING SWITCHES AND EPOXY PACK

1. Use the mike clip hole located to the rear of the cover screw on the lower cover as one of the mounting holes for the switches.
2. Mark the top cover equal distance and in line with this hole. Make new hole for the second switch.
3. Mount the Epoxy Pack approximately 1/8 inch to the rear of these switches. Use silicone sealant mount with the VC up.



CONNECTING RECEIVER SWITCH

1. Remove C-102 (100pf) and relocate it on the PC side of the board, between pin 1 of the VCO, Mixer Chip and the output leg of L-9.
2. Cut the PC trace just to the rear of where C-102 was removed, (adjacent to pin 3 of the VCO, Mixer).
3. Solder wire K in this hole.
4. Strip the wire bare at the spot where it passes the blue dot terminal of the Epoxy Pack. Solder it to the terminal.
5. Solder wire L to the resistor leg of R-16 (TP-2).
6. Solder wire M to the yellow dot terminal on the Epoxy Pack.
7. Solder wire P to the leg of R-69 (82 ohm resistor) located just to the left of TR-14.

LOW CHANNELS FOR COBRA 21/25 PLUS AND SISTER UNITS CONTINUED:

8. Connect wire R to the red dot terminal of the Epoxy Pack.

CONNECTING UP THE TRANSMIT SWITCH

1. Raise the cathode leg of D-15 off the board. It is located just forward of the PLL Chip with its cathode end forward.
2. Solder wire S on the board where D-15 was removed.
3. Solder wire T to the raised cathode leg of D-15.
   *OPTION: If only half channels are desired omit steps 4, 5, and 6 below. If you wish to have full channels these steps must be accomplished.
*4. Solder the VC (supplied) across wires and terminals X and Y.
*5. Remove C-49, located just forward of the 10.24Mhz. Xtal, along side of L-8. (if the legs of C-49 are not long enough to stand one leg up while the other leg is soldered in the most forward hole then replace it with another that is).
*6. Solder wires X and Y to the raised leg of C-49 and the other in the hole it was removed from.

AN ALTERNATE METHOD

For better trimming of the frequency you may desire to drill a hole in the PC board where the Printed Board circuit number is, and run the two wires through to the PC side. In this case do not lift the leg of C-49 but cut the PC run between the 10.24Mhz. Xtal and the leg of C-49. Then connect your wires across this cut.

7. Now solder a jumper wire from the case (shield) of L-6 to the top tank case (shield) on the Epoxy Pack.

ALIGNMENT

TRANSMIT

1. Connect power to the unit and load properly with a frequency counter attached.
2. Select channel 26.
3. With both switches up in normal position, key the transmitter. The reading should be 27.265Mhz. If not, adjust this frequency by changing the size of C-49.
4. Now switch the transmitter switch down, key the transmitter again; now the reading should be 26.810, or if you have the option installed 26.815 Mhz. If you have installed the option and this reading is incorrect,

adjust the VC on the switch to obtain this reading.

RECEIVE

1. Connect a scope or frequency counter to the leg of R-16 (a scope is preferred).
2. On receiver mode and with receiver switch down, you should have a reading of 37.505Mhz. If you have installed the option 37.5117Mhz. (the Epoxy Pack comes preset to the latter).
3. To obtain the proper reading adjust the VC on the Epoxy Pack. The tanks on the Epoxy Pack should require very little or no adjustments. If the 37Mhz signal can not be obtained in the desired amplitude, you might need a 37Mhz. amplifier. They are obtainable from Card-Kit & Selman Enterprises.

(NOTE: When making alignments with a small signal applied, you will detect a zero beat. This zero beat comes from the fact that two internal frequencies, the VCO and 10.24Mhz. combine to make up the same frequency you are trying to receive.

4. Make your normal alignment and adjustment to the receiver on regular channels.
5. Now switch to low channels and check the receiver sensitivity. If you have a needle (or lighted scale) even when no signal is applied or an indication on all low channels, reduce the amplitude of the 37Mhz. signal by inserting a resistor in the output line of the Epoxy Pack. (generally less than 500 ohms).

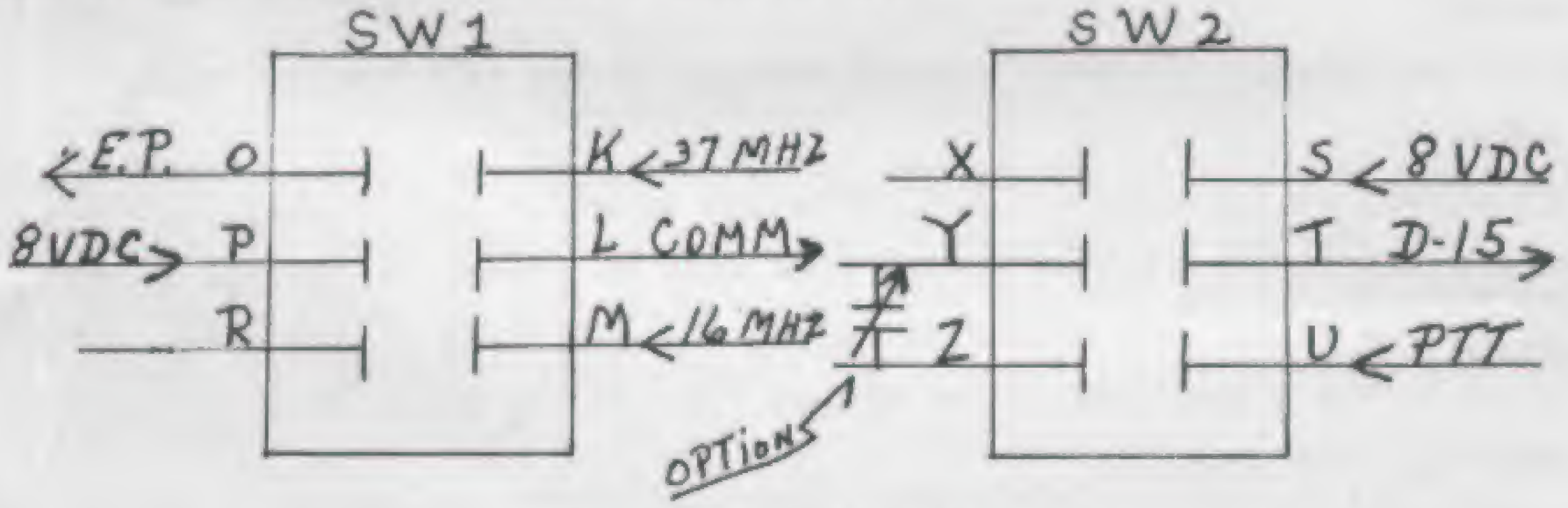
This completes the Installation Instructions for Cobra 21/25 Plus and any Sister Units.

"LTD KIT" HIGH CHANNEL INSTALLATION INSTRUCTIONS FOR COBRA 21/25 PLUS UNITS AND ANY SISTER UNITS

It is not feasible to use the existing switches on these units. We suggest that for any and all single modifications, that you use two DPDT sub-miniature switches. Also, since we will be using 8VDC Regulated (maximum allowable voltage) on the Epoxy Pack, we feel that the final 37Mhz. amplifier can be eliminated. True, you will not have quite as clear of a signal but since the circuits are all on the same plane, you are less likely to pick up stray signals or have as much mutual inductance.

MOUNTING THE SWITCHES AND EPOXY PACK

1. Use the mike clip hole located to the rear of the cover screw on the lower cover as one of the mounting holes for the switches.
2. Mark the top cover equal distance and in line with this hole. Make you a hole there for the second switch.
3. Mount the Epoxy Pack approximately 1/8 inch to the rear of these switches. Use silicone sealant and mount with VC up.



CONNECTING SWITCH #1

1. Remove C-102 from the PC board and solder it to the common or point L on switch #1.
2. Solder a wire between C-102 and the hole it was removed from nearest pin 1 on the VCO, Mixer chip.
3. Solder wire M in the other hole left by removing C-102.
4. Strip wire M bare at the spot it passes the blue terminal and solder it to that terminal.
5. Solder wire K to the yellow dot terminal on the Epoxy Pack.
6. Solder wire P to the leg of R-69 (82 ohm ressitor) located just to the left of TR-14.
7. Connect wire O to the red dot terminal on the Epoxy Pack.

HIGH CHANNELS FOR COBRA 21/25 PLUS AND SISTER UNITS CONTINUED:

CONNECTING SWITCH #2

1. Raise the cathode leg of D-15 off the board. It is located just forward of the PLL chip with it's cathode forward.
2. Solder wire U on the board where D-15 was removed.
3. Solder wire T onto the raised leg of D-15.
4. Solder wire S to 8VDC or wire P of switch #1.

*OPTION: If only half channels are desired omit steps 5, 6, and 7 below. If you wish to operate on full channels these steps must be accomplished.

*5. Solder the VC (supplied) across wires and terminals Y & Z.

*6. Remove C-49, located just forward of the 10.24Mhz. Xtal along side of L-8. (If the legs of C-49 are not long enough to stand one leg up while the other leg is soldered in the forward most hole then replace it with another that is).

*7. Solder wire Y & Z to the raised leg of C-49 and the other in the hole it was raised from.

AN ALTERNATE METHOD

For better trimming of the frequency, you may desire to drill a hole in the PC board where the Printed Circuit number is stamped, and run the two wires through to the PC side. In this case do not lift the leg of C-49, but cut the PC run between the 10.24MHZ Xtal & leg of C-49. Then connect wires across this cut.

8. Now solder a jumper wire form the case (shield) of L-6 to the top tank case (shield) on the Epoxy Pack.

ALIGNMENT

TRANSMIT

1. Connect power to the unit and load properly with a frequency counter attached.
2. Select channel 26.
3. With both switches down in normal position, key the transmitter. The reading should be 27.265Mhz. If not, adjust the frequency by changing the size of C-49.
4. Now switch both switches up. Key the transmitter again. The reading should be 27.720Mhz. If not and you are using half channels, adjust the VC on the Epoxy Pack to obtain this reading. However if you are using full channels the VC you installed and the VC on the Epoxy Pack must be adjusted independently.

*5. Read the VCO frequency at TP-2. It should read 17.0283Mhz. while on receive. If not then adjust the VC on the switch to obtain it.

HIGH CHANNELS FOR COBRA 21/25 PLUS AND SISTER UNITS CONTINUED:

*6. Now key the transmitter and adjust the VC on the Epoxy Pack to obtain a transmitter frequency of 27.725Mhz.

RECEIVE

The receiver should require very little tuning. Go through a normal receiver alignment and adjustment using normal channel 40.

THIS COMPLETES INSTALLATION INSTRUCTIONS FOR COBRA 21/25 PLUS UNITS AND SISTER UNITS.

"LTD KIT" INSTALLATIONS AND INSTRUCTIONS FOR COBRA 29 PLUS AND ANY SISTER UNITS

The installation and alignment instructions for this unit remains about the same as for the Cobra 21 Plus and 25 Plus. EXCEPT:

1. Location and installation of switches and Epoxy Pack.
2. Location of components.
3. The methods of breaking into circuits for switching.

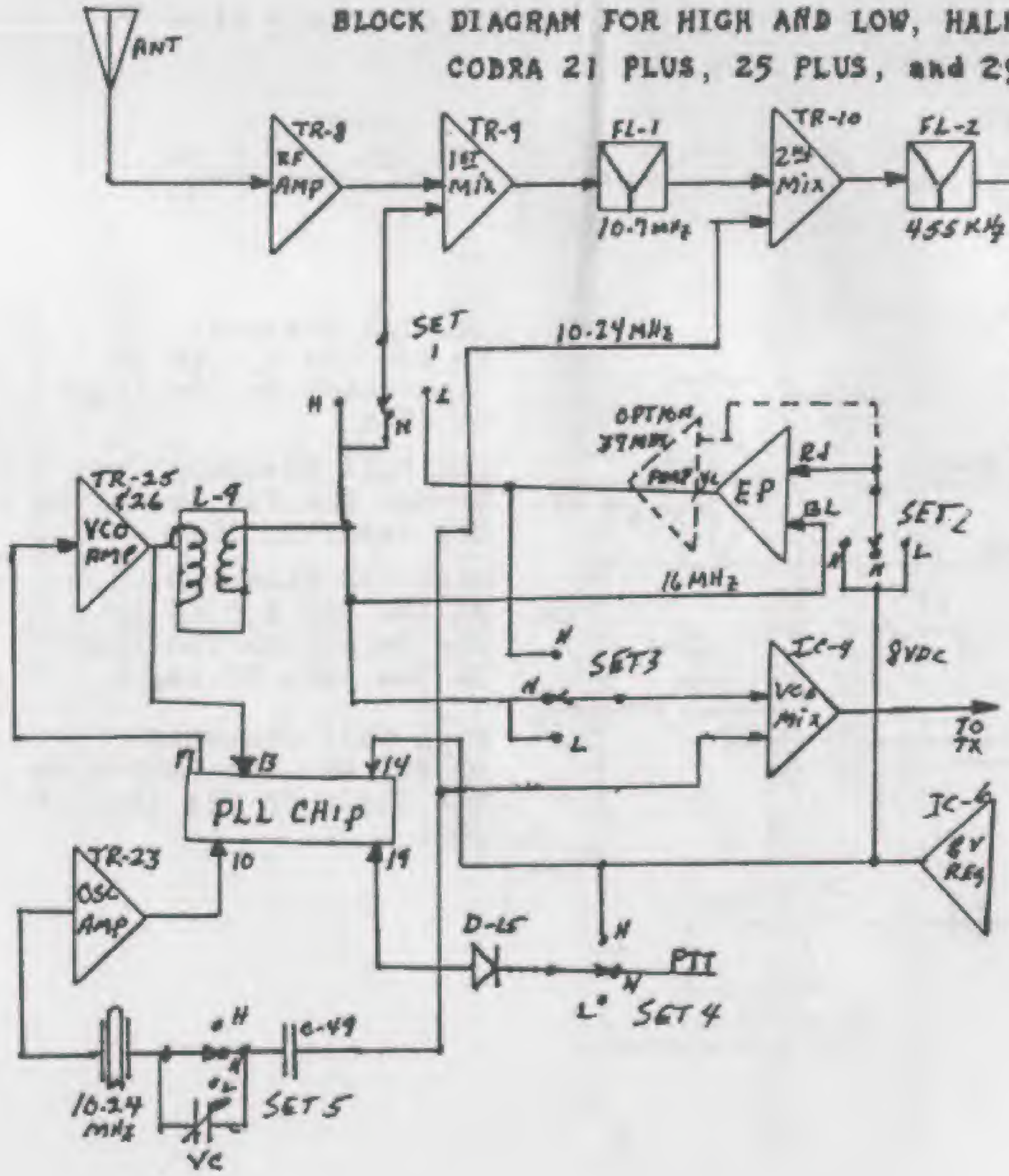
DIFFERENCES

1. We suggest that the second switch be located 1/2 inch and in line front to rear with the first switch.
2. The Epoxy Pack should be located just to the rear of the mounting bolt hole. Put a bolt in to make sure that it clears.
3. On location of components you will find C-49 between FT-1 and L-9.
4. The 8VDC regulated can be better obtained at the long jumper just to the rear of the PLL Chip.
5. If you wish to carry the wires to the PC side of the board for 5K offset, there is a good place to drill the hole just to the rear and slightly left of FT-1.
6. As for breaking into circuits, for low channels, the 16Mhz. signal can be better switched if you raise the leg of R-16 along with the paralleling capacitor C-19 (TP-2).

ALL OTHER THINGS REMAIN ABOUT THE SAME.

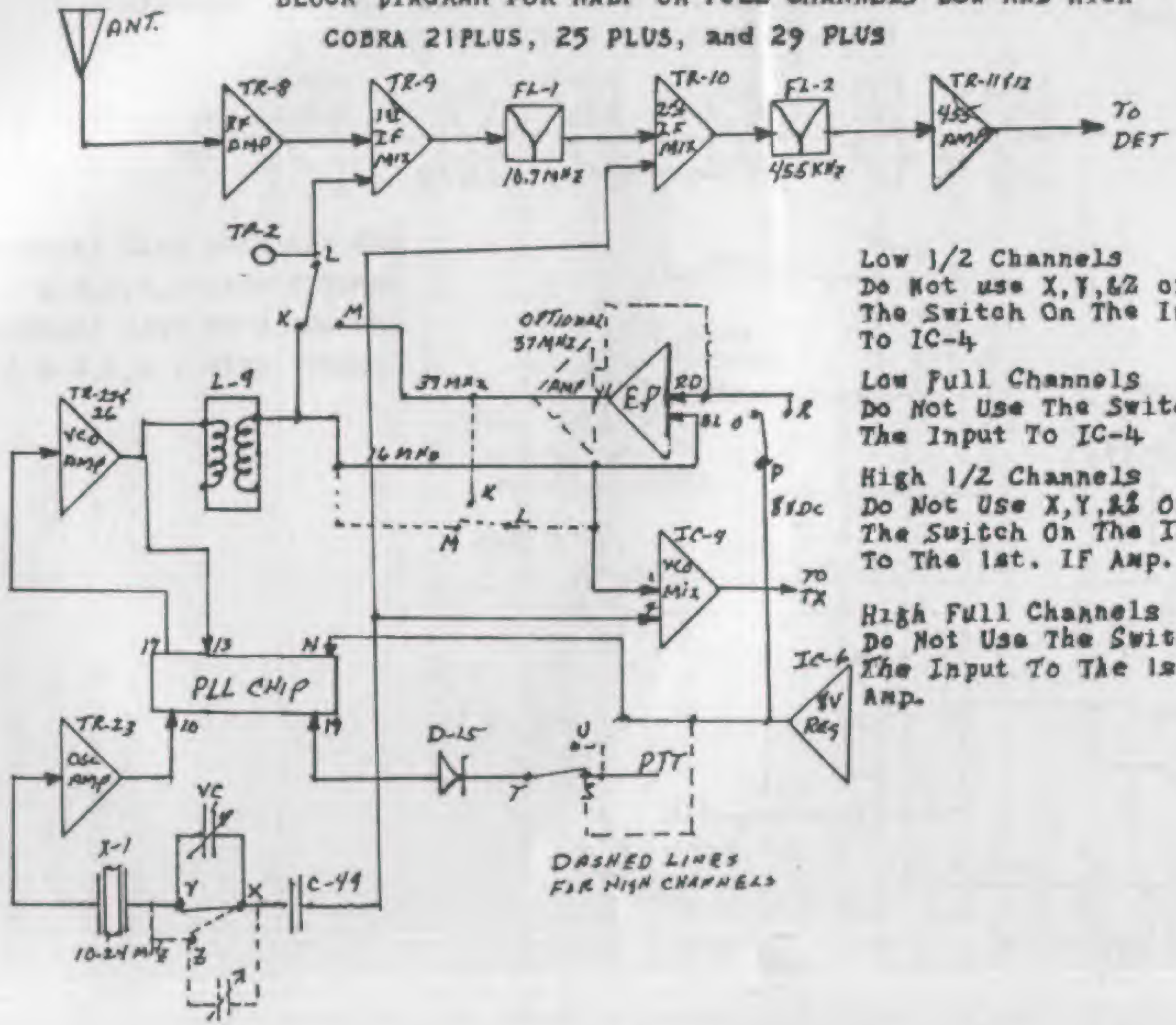
THIS COMPLETES THE INSTALLATION INSTRUCTIONS FOR COBRA 29 PLUS AND ANY SISTER UNITS.

BLOCK DIAGRAM FOR HIGH AND LOW, HALF OR FULL CHANNELS
COBRA 21 PLUS, 25 PLUS, and 29 PLUS



LOW AND HIGH HALF CHANNELS
CONNECT SETS 1,2,3,4 4
LOW AND HIGH FULL CHANNELS
CONNECT SETS 1,2,3,4,& 5

BLOCK DIAGRAM FOR HALF OR FULL CHANNELS LOW AND HIGH
COBRA 21PLUS, 25 PLUS, and 29 PLUS



DASHED LINES FOR HIGH CHANNELS

Low 1/2 Channels
Do Not use X,Y,&Z or
The Switch On The Input
To IC-4

Low Full Channels
Do Not Use The Switch On
The Input To IC-4

High 1/2 Channels
Do Not Use X,Y,&Z Or
The Switch On The Input
To The 1st. IF Amp.

High Full Channels
Do Not Use The Switch On
The Input To The 1st. IF
Amp.

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